TAB 2 (part 3)

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	cle the applicable item in the "result"	column. In-case the spe	cification or requirem	ent is not satisfacto
	blied, make a "punch list" and state the			
	iple punch lists may be used as required		1 ()	•
		Specification/	ъ 1.	ъ.
Item No.	Check List	Requirement	Result	Remarks
	WTG tools, parts and components			
1.14	(Ref.: Dwg. No. N30-10H-0965)			
	Yaw module lifting tool and parts	No damage/	Accepted / Rejected	1
1.14.1	i aw module inting tool and parts	Complete	/ receptour respected	
1.14.1		(see the packing list)		
	Front module lifting tool and parts	No damage/	Accepted / Rejected	
1.14.2	From module mang tool and parts		Accepted/Rejected	
1.14.2		Complete		
	B 11 1'0' 1 1 1	(see the packing list)	A 1 / D 1	
1 1 4 2	Rear module lifting tool and parts	No damage/	Accepted / Rejected	
1.14.3		Complete		
	B . 1 11101	(see the packing list)	1/5/	ļ
	Rotor head lifting tool and parts	No damage/	Accepted / Rejected	
1.14.4		Complete		
		(see the packing list)		
	Electrical cables (in spool)	No damage/	Accepted / Rejected	
1.14.5		Complete		
		(see the packing list)		
	Electrical accessories shipped as	No damage/	Accepted / Rejected	
1.14.6	loose kit (in wire mesh)	Complete		
	, ,	(see the packing list)		
	Comment:		•	
2.	Preparation of the foundation (s	scope of the Custom	er)	
	Visual inspection of all electrical	Through the	Accepted / Rejected	1
	cables in the foundation	embedded conduit,	,	
2.1	Cables in the foundation	enough length, and		
		no damage		
	Resistance of the foundation earth	max = 2 ohm	Accepted / Rejected	Record: ohm
2.2	cables	max – 2 omn	Accepted/Rejected	Record. Omn
		N71 4	Assembled / Deignted	<u> </u>
2.2	Visual inspection of the	No cracks and	Accepted / Rejected	
2.3	foundation	visible voids on the		
		surface		4
2.4	Visual inspection of the anchor	Complete, no bend	Accepted / Rejected	
	bolts	and not rusty		
	Elevation of the anchor bolt ends.	Refer to the	Spec. complied / Not	
2.5		foundation Dwg. of		
۵.5		the Customer		1
		+ mm		
	Match mark of the tower door on	135deg. clockwise	Spec. complied / Not	
2.6	the foundation.	of the dominant		
		wind		
	Difference of the top of the	0 to (-)2mm (max)	Spec. complied / Not	
	leveling nuts relative to the group	Co ()Ziiiii (iiiax)	,	
2.7	of leveling nuts at the opposite			
4.1	(180deg.) of the dominant wind			
	direction.	D	Countied (NY)	
	Verification mark after setting the	Pen or spray paint	Complied / Not	
	leveling nut	marking		
2.8				
2.0				
	This is to check the leveling nut if			
	not accidentally moved			

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Note:		/	L	1 - 48-
Encir	cle the applicable item in the "result"	column. In-case the spe	cification or requiremen	nt is not satisfactori
comp	lied, make a "punch list" and state the	item number and the des	scription of action(s) req	uired.
Multi	ple punch lists may be used as required	ł		
Item No.	Check List	Specification/ Requirement	Result	Remarks
2.9	Cleanliness of the foundation	Free of dirt and other debris	Accepted / Rejected	
	Comment:	,		
	D	1- 1-444		
3.	Preparation and installation of t		zuon	
3.1	Cleaning of the bottom tower section Education Section Education Section Education Section Sec		Complied / Not	
3.1.1	Bottom tower section exterior	Free of rust, dirt & stain/ pressure washed	Complice / Not	
3.1.2	Bottom tower section interior	Free of rust, dirt & stain/ pressure washed or mopped	Complied / Not	
2.1.5	Bottom tower section flanges	free of dirt, rust and	Complied / Not	
3.1.3	(upper & lower)	high spots	-	
	Bottom tower section paint	No damage/	Complied / Not	
3.1.4	(exterior, interior and flanges)	remedial painting (if necessary)		
	Comment:	(If necessary)		
3.2	Pre-installation requirements for the	he hottom tower		
J.Z	Cable hangers	Pre-installed while	Complied / Not	
i	(Ref.: Dwg. 66800-4071)	the bottom tower is		
3.2.1	•GL+1700	laid on the ground		
	•GL+4200			
	•GL+6700	Pre-installed while	Complied / Not	
3.2.2	Safety cable for the personnel	the bottom tower is	Compiled / Not	
3.2.2		laid on the ground		
	Temporary electrical cords for the	Pre-installed while	Complied / Not	
3.2.3	lights and power tools	the bottom tower is		
		laid on the ground		
	Leveling tools, head deflector	Staged onto the	Complied / Not	·····
3.2.4	plate, connecting bolts and	platform while the		
3.2.4	spanners necessary for the lower	tower is laid on the		
	middle tower connection.	ground		
	Comment:			
3.3	Installation of the bottom tower se	ection		
	Lifting tools, riggings and	No damage/	Complied / Not	
3.3.1	accessories.	properly checked before use.		
3.3.2	Tower door	Securely fastened before lifting	Complied / Not	
	Final visual inspection before	No dirt, stain and	Complied / Not	
3.3.3	rotating the tower to the upright	paint damage to the		
	position	tower exteriors		
	Installing the tower onto the	Precautionary	Complied / Not	
_	leveling nuts	measures is used to		
3.3.4		prevent sudden drop to the leveling		

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	cle the applicable item in the "result"			
comp	lied, make a "punch list" and state the	item number and the de-	scription of action(s) re	quired.
Mult	ple punch lists may be used as required			·
Item No.	Check List	Specification/ Requirement	Result	Remarks
	Difference in the level of the top flange of the bottom tower	within d/1000 mm against the	Spec.complied / Not BOP contractor to	Actual record, X:mm
	hange of the bottom tower	horizontal	initial sign below for	Y:mm
3.3.5	X: dominant wind direction	d: diameter of the	confirmation.	
	Y: perpendicular to the dominant wind	top flange of the		
	direction.	bottom tower		
	Earth/ ground cable for the bottom	No rust on the	Complied / Not	
	tower	terminal lug/		
3.3.6		terminate soon		
		after the tower		
	Foot of the tower ladder	level is finalized Fixed after the	Complied / Not	
3.3.7	root of the tower ladder	tower level is	Compact / Not	
3.3.7		finalized		
	Non-shrink grout between the	Completely filled,	Grout Spec.complied /	Record,
	tower and foundation	properly cured, no	Not	Type:
3.3.8		cracks and visible		Curing period:
	Record the results as per ASTM	voids		
	939			
	Anchor bolt initial	As specified by the	Spec.complied / Not	Record,
3.3.9	tightening/tensioning in	Customer's	BOP contractor to initial sign below for	Tool ID:# Tension: kN
3.3.7	accordance to the Customer's	foundation	confirmation.	or
	foundation design	designer.		Torque: kN-m
	Anchor bolt final tension in	As specified by the	Spec.complied / Not	Record,
	accordance to the Customer's	Customer's	BOP contractor to	Tool ID:# Tension: kN
3.3.10	foundation design	foundation designer	initial sign below for	A CAROLOM AND
			confirmation.	
	Access step in front of the tower	Installed correctly	Complied / Not	
3.3.11	door			
	(Ref.: Dwg. 71261-0138)			<u> </u>
3.3.12	Touch up paint for the anchor	Painted	Complied / Not	
	bolts, nuts and tower flange Anchor bolt cover	Installed of the the	Complied / Not	
	Anchor boil cover	Installed after the final tensioning and	Compued / Not	
3.3.13		after the touch-up	}	
		paint is applied		
	Comment:			
4.	Installation of the bottom tower	ground cabinet and	switchgear	
4.1	Installation of the ground cabinet		.	
4.1.1	Lifting eyebolt of the ground	Check if securely	Complied / Not	
7.1.1	cabinet	fastened		
	Wire rope for the lifting of the	Enough length,	Complied / Not	
4.1.2	cabinet	traction angle		
	Constanting	60deg. maximum	Complied / N-4	
112	Ground cabinet cover (panel	Locked/ securely	Complied / Not	
4.1.3	doors)	fastened before		}
	Ground cabinet position/	In accordance w/	Complied / Not	
4.1.4	orientation	the ref. drawing.	Compiled / 140t	1
	(Ref.: Dwg. 66800-4071)			[

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Encir	cle the applicable item in the "result"			
	olied, make a "punch list" and state the		scription of action(s) re	equired.
Mult	iple punch lists may be used as require		,	
Item No.	Check List	Specification/ Requirement	Result	Remarks
4.1.5	Ground cabinet mounting bolts	Fully tightened and w/ red paint line	Complied / Not	
416		marking	Comments 4 / North	
4.1.6	Ground cabinet earth cable	Connected/ cable terminals were fully tightened and with red paint mark	Connected / Not	
4.1.7	Earth cable resistance	max = 2 ohm	Accepted / Rejected	Record: ohm
	Comment:			
4.2	Installation of the switcheser	1		
4.4	Installation of the switchgear Method of installation	Similar to the	Complied / Not	
	iviethod of installation	ground cabinet	Complied / Not	
4.2.1		installation or in		
		accordance to the		
		Customer's		
	Carrital acommoniai J	instructions In accordance with	Complied / Not	
	Switch gear position and		Complica / Not	
4.2.2	mountings	the Customer's specific		
		instructions		
	Comment:	nistructions		
4.0		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
4.3	After the installation of the ground			
	Visual check of the cabinet	No damage/	Accepted / Rejected	
4.3.1	exterior	remedial paint is applied (if the paint		
		is damaged)		
	Visual check of the cabinet	No damage	Accepted / Rejected	
4.3.2	interior (electrical components)	110		
422	Visual check of the switchgear	No damage	Accepted / Rejected	
4.3.3	exterior			
4.3.4	Serial number of the ground cabinet	Record	Complied / Not	
4.3.5	Temporary tarp cover for the ground cabinet	Completely installed	Complied / Not	
4.3.6	Temporary tarpaulin cover for the switchgear	Completely installed	Complied / Not	
	Comment:	· · · · · · · · · · · · · · · · · · ·		
5.	Preparation and installation of	the lower middle to:	ver section	
5.1	Cleaning of the lower middle tow		TOI SOUTOII	
J.1	Lower middle tower section	Free of rust, dirt &	Complied / Not	
5.1.1	exterior	stain/ pressure washed	Compiled / Hot	
	Lower middle tower section	Free of rust, dirt &	Complied / Not	
5.1.2	interior	stain/ pressure		
	T	washed or mopped	Committed (27)	
5.1.3	Lower middle tower section	free of dirt, rust and	Complied / Not	
	flanges (both upper & lower)	high spots	Complied (Net	
	Lower middle tower section paint	No damage/	Complied / Not	
5.1.4	(exterior, interior and flanges)	remedial painting (if necessary)		
	Comment:			

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Encir	cle the applicable item in the "result"	column. In-case the spe	ecification or requiren	nent is not satisfactori
	olied, make a "punch list" and state the		scription of action(s)	equired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/	Result	Remarks
		Requirement	<u> </u>	Temarks
5.2	Pre-installation requirements for the			
	Control cables and cable support	Pre-installed while	Complied / Not	
5.2.1	(Ref.: Dwg. 66800-4071)	the tower is laid on		
		the ground		
	Safety cable for the personnel	Pre-installed while	Complied / Not	
5.2.2		the tower is laid on		
		the ground		
	Temporary electrical cords for the	Pre-installed while	Complied / Not	
5.2.3	lights and power tools	the tower is laid on	•	
	# · · · · · · · · · · · · · · · · · · ·	the ground		
	Necessary tools for the upper	Staged onto the	Complied / Not	
5.2.4	middle tower installation (e.g.	platform while the		
	head deflector plate, connecting	tower is laid on the		
	bolts, spanners and etc.,)	ground		
	Comment:			
5.3	Installation of the lower middle to	wer section		
J.J	Lifting tools, riggings and	No damage/	Complied / Not	
5.3.1	accessories.	properly checked	Complica / Not	
3.3.1	accessories.	before use	•	
	Final visual inspection before	No dirt, stain and	Complied / Not	
5.3.2	rotating the tower to the upright	paint damage to the	Compiled / 110t	
3.3.2	position	tower exterior		
	Silicone sealant for the tower	Applied correctly	Complied / Not	
	flange connection	and not yet cured		
	(Applied in a single continuous	when the tower is		
5.3.3	bead in the area between outer	connected		
	diameter of the flange and the bolt			
	hole.)		ł	
5.3.4	Match mark of the tower flanges	Aligned	Complied / Not	
5.3.5	Ladder connection	Aligned/ not bent	Complied / Not	
	Connecting bolts orientation	Installed correctly	Complied / Not	
	• All bolt heads were on the lower		1	
	flange and with washer			
5.3.6	Beveled part of the washer in			
	contact with the bolt head and			
	nut			
	Connecting bolts I.D.	Numbered in the	Complied / Not	
5.3.7	, e	clockwise order/		
		direction		
	Ladder splice plate	Installed and	Complied / Not	
5.3.8		tightened before		
3.3.8		any personnel is		
		allowed to climb		
	Tower earth cables	Installed	Complied / Not	
520		immediately after		
5.3.9		the tower is		
		connected		
	Tower earth cable terminal	No rust/ fully	Complied / Not	
		tightened/ red line		
5.3.10		marking is applied		
		after the touch-up		
		paint		

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Encir	cle the applicable item in the "result"	column. In-case the spe	cification or requireme	ent is not satisfactor
	blied, make a "punch list" and state the		scription of action(s) re	equired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/	Result	Remarks
10111110.	Check Dist	Requirement		Romarks
	Head protector/ deflector plate for	Installed/ aligned to	Complied / Not	
5.3.11	the tower connecting flange.	the centerline of the		
		ladder		
	Initial tightening of the connecting	700Nm, first 8pc in	Complied / Not	
5.3.12	bolts with an impact wrench	star pattern,		
3.3.12		remaining bolts in		
		circular pattern		
5.3.13	Initial tightening line marking	Yellow paint pen	Complied / Not	
	Final tension of the bottom tower	Final tension:	Spec. complied / Not	Record,
	and the lower middle M42			Tool ID:#
5.3.14	connecting bolts	Max = 760kN	BOP contractor to	Tension: kN
			initial sign below for the confirmation.	
			and commination.	
	Line marking after the tensioning	·Blue paint pen	Complied / Not	
5.3.15	of the bolts and checking	1 -1		
	Touch-up paint for the connecting	The same with the	Complied / Not	
5.3.16	bolts and flange	tower interior paint	-	
	Line marking after the touch-up	Red paint pen	Complied / Not	
5.3.17	painting		•	
	Comment:			
6.	Preparation and installation of t	he upper middle tow	ver section	
6.1	Cleaning of the upper middle towe	er section		
	Upper middle tower section	Free of rust, dirt &	Complied / Not	
6.1.1	exterior	stain/ pressure		
		washed		
	Upper middle tower section	Free of rust, dirt &	Complied / Not	
6.1.2	interior	stain/ pressure		
	Upper middle tower section	washed or mopped	Complied / Not	
6.1.3	Upper middle tower section flanges	washed or mopped free of dirt, rust and	Complied / Not	
6.1.3	flanges	washed or mopped	Complied / Not	
6.1.3	flanges (both upper & lower)	washed or mopped free of dirt, rust and high spots	Complied / Not	
6.1.3	flanges	washed or mopped free of dirt, rust and high spots		
	flanges (both upper & lower) Upper middle tower section paint	washed or mopped free of dirt, rust and high spots No damage/ remedial painting		
	flanges (both upper & lower) Upper middle tower section paint	washed or mopped free of dirt, rust and high spots		
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment:	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary)	Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower	Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment:	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while	Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) the upper middle tower Pre-installed while the tower is laid on	Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) the upper middle tower Pre-installed while the tower is laid on the ground	Complied / Not Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) the upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while	Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) the upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on	Complied / Not Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel Temporary electrical cords for the lights and power tools	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on the ground	Complied / Not Complied / Not Complied / Not	
6.1.4 6.2.1 6.2.2	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel Temporary electrical cords for the lights and power tools Necessary tools for the top tower	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on the ground Staged onto the	Complied / Not Complied / Not	
6.1.4	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel Temporary electrical cords for the lights and power tools Necessary tools for the top tower installation (e.g. head deflector	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on the ground Staged onto the platform while the	Complied / Not Complied / Not Complied / Not	
6.1.4 6.2.1 6.2.2	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel Temporary electrical cords for the lights and power tools Necessary tools for the top tower	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on the ground Staged onto the	Complied / Not Complied / Not Complied / Not	
6.1.4 6.2.1 6.2.2	flanges (both upper & lower) Upper middle tower section paint (exterior, interior and flanges) Comment: Pre-installation requirements for the Safety cable for the personnel Temporary electrical cords for the lights and power tools Necessary tools for the top tower installation (e.g. head deflector	washed or mopped free of dirt, rust and high spots No damage/ remedial painting (if necessary) ne upper middle tower Pre-installed while the tower is laid on the ground Pre-installed while the tower is laid on the ground Staged onto the platform while the	Complied / Not Complied / Not Complied / Not	

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Enci	rcle the applicable item in the "result"	column. In-case the spe	ecification or requireme	ent is not satisfactori
	olied, make a "punch list" and state the		scription of action(s) re	equired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/	Result	Remarks
nem no.	CHECK LIST	Requirement	Result	Kemarks
6.3	Installation of the upper middle to	wer section		
	Lifting tools, riggings and	No damage/	Complied / Not	
6.3.1	accessories	properly checked		
		before use		
	Final visual inspection before	No dirt, stain and	Complied / Not	
6.3.2	rotating the tower to the upright	paint damage to the	•	
	position	tower exterior		
	Silicone sealant for the tower	Applied correctly	Complied / Not	
	flange connection	and not yet cured		
	(Applied in a single continuous	when the tower is		
6.3.3	bead in the area between outer	connected		
	diameter of the flange and bolt	Connected		
	hole.)			
6.3.4	Match mark of the tower flanges	Aligned	Complied / Not	
	Ladder connection	Aligned/ not bent	Complied / Not	
6.3.5			Complied / Not	
	Connecting bolts orientation	Installed correctly	Compiled / Not	
	• All bolt heads were on the lower			
6.3.6	flange and with washer			
	Beveled part of washer in			
	contact with bolt head and nut			
6.3.7	Connecting bolts I.D.	Numbered in the	Complied / Not	
		clockwise order		
	Ladder splice plate	Installed and	Complied / Not	
6.3.8		tightened before		
		any personnel is		
		allowed to climb		
	Tower earth cables	Installed	Complied / Not	
6.3.9		immediately after		
0.5.5		the tower is		
		connected		
	Tower earth cable terminal	No rust/ fully	Complied / Not	
		tightened/ red line		
6.3.10		marking is applied		
		after the touch-up		
		paint		
	Head protector/ deflector plate for	Installed/ aligned to	Complied / Not	
6.3.11	the tower connecting flange.	the centerline of the		
		ladder		
	Initial tightening of the connecting	700Nm, first 8pc in	Complied / Not	
6.3.12	bolts with an impact wrench	star pattern,		
0.5.12		remaining bolts in		
		circular pattern		
6.3.13	Initial tightening line marking	Yellow paint pen	Complied / Not	
	Final tension of the lower middle	Final tension:	Spec. complied / Not	Record,
(214	and upper middle tower M36		BOP contractor to	Tool ID:#
6.3.14	connecting bolts	Max = 550kN	initial sign below for	Tension: <u>kN</u>
	_		the confirmation.	
	Line marking after the tensioning	Blue paint pen	Complied / Not	-
6.3.15	and checking	Dide hamt hen		
	Touch-up paint for the connecting	Same with the	Complied / Not	
6.3.16	bolts and flange	tower interior paint		
	oom and nange	1 www. micrioi panit		1

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nent is not satisfactori
required.
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	cle the applicable item in the "result"	column. In-case the spe	ecification or requirem	ent is not satisfactori
	lied, make a "punch list" and state the			
	iple punch lists may be used as required			1
	•	Specification/	D1+	Dt
Item No.	Check List	Requirement	Result	Remarks
	Connecting bolts orientation	Installed correctly	Complied / Not	
	• All the bolt heads were on the	,	_	
	lower flange and with washer.			
7.3.6	Beveled part of the washer in	•		
	contact with the bolt head and			
	nut		·	
	Connecting bolt I.D.	Numbered in the	Complied / Not	
7.3.7		clockwise order		
	Ladder splice plate	Installed and	Complied / Not	
7.00	• •	tightened before		
7.3.8		any personnel is		
		allowed to climb		
	Tower earth cables	Installed	Complied / Not	
720		immediately after		
7.3.9		the tower is		
		connected		
	Tower earth cable terminal	No rust/ fully	Complied / Not	
		tightened/ red line		
7.3.10		marking is applied		
		after the touch-up		
		paint		
	Head protector/ deflector plate for	Installed/ aligned to	Complied / Not	
7.3.11	the tower connecting flange	the centerline of		
		ladder		
	Initial tightening of connecting	700Nm, first 8pcs	Complied / Not	
7.3.12	bolts with an impact wrench	in star pattern, the		
7.5.12		remaining bolts in		
		circular pattern		
7.3.13	Initial tightening line marking	Yellow paint pen	Complied / Not	
	Final tension of the upper middle	Final tension	Spec. complied / Not	Record,
7.3.14	and top tower M36 connecting		BOP contractor to initial sign below for	Tool ID:# Tension:kN
7.5.14	bolts	Max = 550kN	confirmation.	Telision. KN
7.3.15	Line marking after the tensioning	Blue paint pen	Complied / Not	
7.3.13	and checking			
7.3.16	Touch-up paint for the connecting	Same with tower	Complied / Not	
7.3.10	bolts and flange.	interior paint		
7.3.17	Line marking after touch-up	Red paint pen	Complied / Not	
1.3.17	painting			
	Comment:			
9	D	t		
8.	Preparation and installation of t	ne yaw module		
8.1	Preparation of the yaw module		To 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	
	Exterior transportation cover	Completely remove	Complied / Not	
8.1.1	47			
	(Except the tarpaulin roof and			
	support frame)	NT. 12 / 2	Complied / Net	
0.1.0	Yaw module exterior surfaces	No dirt, stain and	Complied / Not	
8.1.2		paint coat damage		
		to the exterior		<u> </u>

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Encir	rcle the applicable item in the "result"	column. In-case the sp	ecification or requireme	ent is not satisfactori
	olied, make a "punch list" and state the			
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/ Requirement	Result	Remarks
	Initial oil tank level of the	0 to (-)5mm of the	Complied / Not	
8.1.3	hydraulic control unit (tank level	H-Level line	Compiled 1100	
0.1.5	gauge)	11-Level line		
	Hydraulic oil purifier used for	Cleanliness is in	Complied / Not	-
8.1.4	re-filling	accordance with	- Company	
0.1.4	10-mmg	ISO 4406 17/14		
	Initial oil tank level of the main	MAX-Level line	Complied / Not	
8.1.5	bearing lubrication oil (tank level	TAMES ECVENIME	1	
0.1.5	gauge)			
-	Lubrication oil purifier used for	Cleanliness is in	Complied / Not	
8.1.6	re-filling	accordance with	1	
0.1.0	1	ISO 4406 17/14		
	Initial oil level of yaw gear motors	Above the	Complied / Not	
8.1.7	(4 units, sight glass)	centerline		
	Accumulator gas pressure			Re-charge if it is
8.1.8	-Main accumulator(ACC-101)	13 MPa +/	Sufficient / Insufficient	insufficient.
	-Brake accumulator(ACC-102)	17 MPa +/	Sufficient / Insufficient	
	Necessary tools for front the	Staged inside the	Complied / Not	
8.1.9	module installation (e.g.	yaw module while		
6.1.9	connecting bolts, ladder assembly,	on the ground.		
	spanners and etc.)			
	Comment:			
8.2	Installation of the yaw module			
0.2	Lifting tools, riggings and	No damage/	Complied / Not	
8.2.1	accessories.	properly checked		
0.2.1	decessories.	before use.		
	Final visual inspection before	No dirt, stain,	Complied / Not	
	lifting the yaw module from the	remaining covers,	•	
8.2.2	ground	and paint damage		
	8	to exteriors.		
	Yaw module bottom part	Cleaned before	Complied / Not	
8.2.3	•Rust preventive coating in the	lifting onto the top	-	
	matting surface for top tower	tower		
	Guide bars	Installed before	Complied / Not	
8.2.4		lifting onto the top		
		tower		
026	Match mark of yaw bearing and	Aligned	Complied / Not	
8.2.5	tower top flange			
	Yaw module connecting bolts	Installed correctly	Complied / Not	
	(Ref.: Dwg. N30-C10-0777)			1
	• No clearance between bolt heads,			
8.2.6	washers and tower flange when			
3.2.0	installed.			
	Chamfered part of washer in			
	contact with bolt head.			
	• Applied with lubricants.	NT	Complied / Not	+
8.2.7	Connecting bolt I.D.	Numbered in the	Complied / Not	
	Initial tightaning -Cd	clockwise order	Complied / Not	+
	Initial tightening of the connecting	700Nm, first 8pcs	Complied / Not	
8.2.8	bolts with an impact wrench	in star pattern, remaining bolts in		
	<u> </u>	circular pattern	I	1

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comp	olied, make a "punch list" and state the	item number and the de	scription of action(s) re	equired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/ Requirement	Result	Remarks
8.2.9	Initial tightening line marking	Yellow paint pen	Complied / Not	
	Nacelle ladder assembly and cable	Installed correctly/	Complied / Not	
	guide	bolts were properly		
8.2.10	(Ref.: Dwg. N30-C10-0777)	tightened and with		
		red pain pen		
		marking		
	Yaw brake oil pan	Installed correctly/	Complied / Not	
	(Ref.: Dwg. N30-C10-0970)	bolts were properly		
8.2.11		tightened and with		
		red paint pen		
		marking	Complied / Net	
8.2.12	Automatic yaw bearing lubrication	Installed correctly	Complied / Not (optional item)	(optional item)
	system (if required)	(optional item)	Spec. complied / Not	Record,
	Final torque of the yaw module	Final tightening	BOP contractor to	Tool ID:#
8.2.13	connecting bolts	torque 3,395N-m to	initial sign below for	Torque: kN-m
0.2		3,495N-m.	the confirmation.	1 *
			0 1: 1/33	
8.2.14	Line marking after the final torque	Blue paint pen	Complied / Not	
	and checking	6 11 1	Colied / Net	+
0015	Touch-up paint for the yaw	Same with the	Complied / Not	
8.2.15	module connecting bolts and	tower interior paint		
	tower flange. Line marking after the touch-up	Dadasistas	Complied / Not	
8.2.16	painting	Red paint pen	Complica / Not	
	Comment:	<u> </u>		
	Common.			
9.	Preparation and installation of t	he front module		
9.1	Preparation of the front module			
	Exterior transportation cover	Removed	Complied / Not	
9.1.1	•	completely		
	(Except the rear tarpaulin cover)			
	Front module exterior surfaces	No dirt, stain and	Complied / Not	
9.1.2		paint coat damage		
		to the exterior		
	L.O. Coolers (2 units)	Installed correctly/	Complied / Not	İ
	(Ref.: Dwg. N30-A10-1302)	no damage		
9.1.3	Set into upright position	occurred/ bolts		
,,,,,	Mounting bolts	fully tightened and		
		with red paint pen		
		mark	0 1 1 2 2 2	
	Flexible hose connections for L.O.	Installed correctly,	Complied / Not	
	coolers	no contaminants		
9.1.4	(Ref.: Dwg. N30-A10-1302)	when connected/		
		fully tightened and		
		with red paint pen		
	T-14-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	mark	Complied / Not	1
9.1.5	Initial lubrication oil level of the	0 to +10mm (max)	Complied / Not	
	main gearbox (level gauge)	of the H-Level line	Complied / Not	1
017	Hydraulic oil purifier used for	Cleanliness is in	Complied / Not	
9.1.6	re-filling	accordance with		1
	L	ISO 4406 17/14	i	1

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	olied, make a "punch list" and state the		scription of action(s)	required.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/ Requirement	Result	Remarks
	Exhaust duct and the top cover	No damage/	Complied / Not	
	assembly	installed correctly/		
9.1.7	(Ref.: Dwg. N30-C10-1019)	Sealant is applied		
		as specified in the		
		drawing.		
	FAA lights (if necessary)	In accordance with	Complied / Not	
9.1.8		the Customer's		
		specifications		
9.1.9	Disc brake condition before	No contact/ Disc	Complied / Not	}
	installation of front module	rotates freely	C 11. 1 / N 4	
	High speed shaft locking pin	Installed after the	Complied / Not	
9.1.10		confirmation that		
		the disc rotates	1	
	Matalana da (Garaba anta da	freely Top most position	Complied / Not	
9.1.11	Match mark (for the rotor head) on the main bearing	1 op most position	Complied / Not	
	Comment:	I		
9.2	Installation of the front module	NT 1 /	Complied / Not	-т
021	Lifting tools, riggings and accessories.	No damage/	Compiled / Not	
9.2.1	accessories.	properly checked before use.		
	Final visual inspection before	No dirt, stain,	Complied / Not	
	lifting the front module from the	remaining covers,	Compiled	
9.2.2	ground	and no paint	ļ	
,,,,,	Brown	damage to the		
		exterior		
	Front module bottom part and the	Cleaned before	Complied / Not	
9.2.3	rust preventive coating in the	lifting onto the yaw		
7.2.3	matting surface for the yaw	module		
	module			
	Guide bars	Installed before	Complied / Not	
9.2.4		lifting onto the yaw		
		module	0 - 1 - 1 / 37 /	
9.2.5	Match mark of the yaw and front	Aligned	Complied / Not	
	modules Front module connecting holts	Installed correctly	Complied / Not	-
	Front module connecting bolts (Ref.: Dwg. N30-C10-0970)	mstaned correctly	Compiled / Not	
	No clearance between the bolt	B		
	heads, washers and the yaw			
9.2.6	module tube flange when			
	installed.	11 12 12 12 12 12 12 12 12 12 12 12 12 1		
	Chamfered part of the washer is			
	in contact with the bolt head.			
	Applied with lubricant			
9.2.7	Connecting bolt I.D.	Numbered in the	Complied / Not	
		clockwise order		
	Initial tightening of the connecting	700N-m, first 8pcs	Complied / Not	
9.2.8	bolts	in the star pattern,		
		remaining bolts in		
	Tuisial si absoniu a 11 a annului a	circular pattern	Complied / Not	
9.2.9	Initial tightening line marking	Yellow paint pen	Complied / Not	

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	rcle the applicable item in the "result"			
	olied, make a "punch list" and state the		scription of action(s) re	equired.
Multi	iple punch lists may be used as required	i		
Item No.	Check List	Specification/ Requirement	Result	Remarks
	Ladder (yaw to the front module	Installed correctly/	Complied / Not	
9.2.10	access)	bolts were properly	Compiled / Not	
7.2.10	(Ref.: Dwg. N30-C10-0970)	tightened		
	Final torque of the front module	Final tightening	Spec. complied / Not	Record,
	connecting bolts	torque 3,395N-m to	BOP contractor to	Tool ID:#
9.2.11	Connecting cons	3,495N-m.	initial sign below for	Torque: kN-m
		5,49514-III.	the confirmation.	
0.2.12	Line marking after the final torque	Blue paint pen	Complied / Not	
9.2.12	and checking			
	Touch-up paint for the front	The same with the	Complied / Not	
9.2.13	module connecting bolts and the	tower interior paint		
	tower flange.			
9.2.14	Line marking after the touch-up	Red paint pen	Complied / Not	
	painting Comment:	<u> </u>		
10.	Preparation and installation of t	he rear module		
10.1	Preparation of the rear module			T
10.1.1	Exterior transportation cover	Removed	Complied / Not	
	Front module exterior surfaces	No dirt, stain and	Complied / Not	
10.1.2		paint coat damage	· •	
		to the exterior		}
	Lightning rod and ultrasonic wind	No damage/	Complied / Not	
	sensor assembly	installed correctly/		
10.1.3	(Ref.: Dwg. N30-A10-1350)	Sealant is applied		
		as specified in the		
		drawing		
	Tools, parts and components for	Staged inside the	Complied / Not	
1014	the rotor head and nacelle	rear module while		İ
10.1.4	connection	on the ground		
	(e.g. M36x595 stud bolts, M36nuts,			
	washers, and all necessary tools) Tools, parts and components for	Staged inside the	Complied / Not	
	the low speed azimuth sensor	rear module while	Compiled / Not	
10.1.5	assembly	on the ground		
	(Ref.: Dwg. N30-A10-1373)	on the ground		
	Tools, parts and components for	Staged inside the	Complied / Not	
10.1.6	the nacelle cover connection	rear module while		
	(Ref.: Dwg. N30-C10-1018)	on the ground		
10.2	Installation of rear module		•	
	Lifting tools, rigging and	No damage/	Complied / Not	
10.2.1	accessories.	properly checked		
		before use		
	Final visual inspection before	No dirt, stain,	Complied / Not	
	Timal visual hispection before		1	1
	lifting the rear module from the	remaining covers,	1	1
10.2.2	lifting the rear module from the ground	and no paint		
10.2.2	lifting the rear module from the	and no paint damage to the		
10.2.2	lifting the rear module from the ground	and no paint damage to the exterior		
10.2.2	lifting the rear module from the ground Lifting lug plates for the front	and no paint damage to the exterior Removed before	Complied / Not	
10.2.2	lifting the rear module from the ground	and no paint damage to the exterior	Complied / Not	

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	cle the applicable item in the "result"			
	olied, make a "punch list" and state the		scription of action(s) re	equired.
Mult	iple punch lists may be used as required	Specification/		T
Item No.	Check List	Requirement	Result	Remarks
	Nacelle frame connecting flange	Cleaned/ no rust/	Complied / Not	
	(on the front module side)	anti-rust coat is	Compiled / 1100	İ
10.2.4	(611 4110 1110 1110 41110 51110)	removed before		i
		lifting the rear		
		module		
	Nacelle frame connecting flange	Cleaned/ no rust/	Complied / Not	
	(on the rear module side)	anti-rust coat is]]	
10.2.5		removed before		
		lifting the rear module		
	Guide bars	Installed before	Complied / Not	
10.2.6	Guide buis	lifting the front		
		module		
	Rear module lower frame	Installed correctly	Complied / Not	
	connecting bolts			
	(Ref.: Dwg. N30-10T-0524)			
	• No clearance between the bolt			
10.2.7	heads, washers and the flange of the yaw module tube when			
	installed.			
	Chamfered part of the washer in			
	contact with the bolt head			
	Applied with lubricant			
	Rear module upper frame	Installed correctly	Complied / Not	
	connecting beam and plate ass'y (Ref.: Dwg. N30-10T-0524)			
10.2.8	• All the bolts were installed			
	Chamfered part of the washers in			
	contact with the bolt heads			
	Initial tightening of the lower	700N-m, all bolts	Complied / Not	
10.2.9	frame connecting bolts with an	tightened in star		
1000	impact wrench	pattern	Ö	
10.2.9	Initial tightening line marking	Yellow paint pen	Complied / Not Spec. complied / Not	Record,
	Final torque of the front module connecting bolts	Final tightening torque 4,420N-m to	BOP contractor to	Tool ID:#
10.2.10	connecting boits	4520N-m	initial sign below for	Torque: kN-m
		132011 111	the confirmation.	
44.5.11	Line marking after the final torque	Blue paint pen	Complied / Not	
10.2.11	and checking	Zine pamie pen	•	
	Touch-up paint for the rear	Applied	Complied / Not	
10.2.12	module lower frame connecting	••		
	bolts and connecting flange			
	Line marking for the lower frame	Red paint pen	Complied / Not	
10.2.13	connecting bolts after the touch-up			
	painting Torque of the unner frame		Spec. complied / Not	Record,
	Torque of the upper frame connecting bolts	575-595N-m	Spec. compiled / Not	Tool ID:#
10.2.14	Comiconing boits	3/3-373IN-III	BOP contractor to	Torque: kN-m
10.2.14			initial sign below for	
			the confirmation.	
10015	Line marking for the upper frame	Red paint pen	Complied / Not	
10.2.15	connecting bolts after the torque	' '		

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	cle the applicable item in the "result"	column. In-case the spe	cification or requirer	nent is not satisfactori
	blied, make a "punch list" and state the			
	iple punch lists may be used as required			•
		Specification/		T
Item No.	Check List	Requirement	Result	Remarks
	Nacelle cover joining part	Installed correctly/	Complied / Not	
	between the yaw and rear module	bolts were fully	1	
10.2.16	(Ref.: Dwg. N30-C10-1018)	tightened and		
10.2.10	(Ner.: Dwg. N30-010-1010)	marked with red		
		paint pen		
	NT11 :-:-:	Installed correctly/	Complied / Not	
	Nacelle cover joining part		Complica / Not	
10015	between the front and rear module	bolts were fully		
10.2.17	(Ref.: Dwg. N30-C10-1018)	tightened and		
		marked with red		
		paint pen		
	Comment:			
11	A ativities after the manufile !	llation		
11.	Activities after the nacelle insta			
11.1	Installation of the electrical cables			<u>G</u>
	Cable routing and the electrical	Installed correctly	Complied / Not	
11.1.1	accessories installation inside the	as specified in the		
11.1.1	tower	reference drawing		+
	(Ref.: Dwg. 66800-4521)			
	Electrical instruments for the	Installed correctly	Complied / Not	
11.1.2	WTG	as specified in the		
11.1.2	I WIG			
11.1.2		reference drawing		
11.1.2	(Ref.: Dwg. 66800-4071)			
	(Ref.: Dwg. 66800-4071) Comment:			
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle	reference drawing	Complied / Not	
	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the		Complied / Not	
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings	Properly closed		
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly	Properly closed Installed correctly/	Complied / Not	
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access)	Properly closed Installed correctly/bolts were fully		
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly	Properly closed Installed correctly/ bolts were fully tightened and		
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access)	Properly closed Installed correctly/ bolts were fully tightened and marked with red		
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen	Complied / Not	
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/		
11.2.1	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully	Complied / Not	
11.2	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and	Complied / Not	
11.2.1	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red	Complied / Not	
11.2.1	Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen	Complied / Not Complied / Not	
11.2.1	Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly	Complied / Not	
11.2.1	Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and ultrasonic wind sensor	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly as specified in the	Complied / Not Complied / Not	
11.2.1	Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and ultrasonic wind sensor (Ref.: Dwg. 66800-4071)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly as specified in the reference drawing	Complied / Not Complied / Not	
11.2 11.2.1 11.2.2 11.2.3	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and ultrasonic wind sensor (Ref.: Dwg. 66800-4071) Cables of the FAA light	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly as specified in the reference drawing In accordance with	Complied / Not Complied / Not	
11.2.1	Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and ultrasonic wind sensor (Ref.: Dwg. 66800-4071)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly as specified in the reference drawing In accordance with the Customer's	Complied / Not Complied / Not	
11.2 11.2.1 11.2.2 11.2.3	(Ref.: Dwg. 66800-4071) Comment: Activities inside the nacelle Nacelle top cover hatches for the personnel and riggings Ladder assembly (yaw to the rear module access) (Ref.: Dwg. N30-C10-0970) Nacelle service winch (Ref.: Dwg. N30-C10-1018) Cables of the lightning rod and ultrasonic wind sensor (Ref.: Dwg. 66800-4071) Cables of the FAA light (if applicable)	Properly closed Installed correctly/ bolts were fully tightened and marked with red paint pen Installed correctly/ bolts were fully tightened and marked with red paint pen Connected properly as specified in the reference drawing In accordance with the Customer's documentation	Complied / Not Complied / Not Complied / Not	
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	olied, make a "punch list" and state the		scription of action(s) re	quired.
Mult	iple punch lists may be used as required		1	
Item No.	Check List	Specification/	Result	Remarks
	T O alaba association	Requirement	Complied / Not	
11.00	L.O. piping assembly	Connected properly	Compiled / Not	
11.2.9	(Ref.: Dwg. N30-A10-1369)	as specified in the		
		reference drawing	0 1 1/2	
11010	G.O. piping assembly	Connected properly	Complied / Not	
11.2.10	(Ref.: Dwg. N30-T10-0202)	as specified in the		
		reference drawing	0 11 1/07	
11.2.11	G.O. piping system	Air is removed by	Complied / Not	
		bleeding/ no leaks		
	Flexible joining part of the	Installed properly	Complied / Not	
11.2.12	generator exhaust duct	as specified in the		
	(Ref.: Dwg. N30-A10-1369)	reference drawing		
	Shipping/ packaging materials	Completely	Complied / Not	
11.2.13	inside the nacelle	removed and		
11.2.13	(transportation support, plastic	properly disposed		
	cover, lug plate, fasteners, etc.,)			
	Working areas and the walkways	No oil spill and	Complied / Not	
11.2.14	around the nacelle	tripping hazards		
	Nacelle yaw direction	Facing the	Complied / Not	
11.2.15	1 Tracenc yaw direction	dominant wind	- Compared / Troop	
	Comment:	dominant wind	L	L
	Comment.			
12.	Preparation of the rotor head an	d blades		
12.1	Rotor head preparations			
	Location of the rotor head for the	Blade can be	Complied / Not	1
12.1.1	blade installation	installed without	Compiled / 1 tol	
12.111		interference		
	Ground/ field condition for the	Flat/ the rotor head	Complied / Not	
	assembly of the rotor head	transport frame will		
12.1.2	abbeniery of the fotor nead	not sink		
12.1.2		(provide steel		
		plates as required)		
	Transportation cover	Removed	Complied / Not	
12.1.3	Transportation cover	Kenioved	Compiled / 140t	
	Rotor head exterior surface	No dirt, stain and	Complied / Not	<u> </u>
12.1.4	10001 Head CARRIOI SUITAGE	paint coat damage		
14.1.4		to the exteriors		1
	Rotor head interior surfaces, parts	No dirt, no damage	Complied / Not	
12.1.5			Complica / Not	
	Area around the helt heles for the	and no oil leaks	Complied / Not	ļ
10.1.6	Area around the bolt holes for the	No dirt, no rust,	Compiled / Not	
12.1.6	blade (inside the rotor head)	anti-rust coating is		
		removed	O1-4/21 /	
12.1.7	Mating surface for the blade	No dirt, no rust, no	Complied / Not	
	(flange area of the blade bearing)	high spots	<u> </u>	
12.1.8	Temporary hydraulic unit for	Properly checked/	Complied / Not	
12.1.0	changing the pitch angle	no contaminants		<u> </u>
	Comment:			
12.2	Plada nyanayatiana	<u> </u>	<u> </u>	1
12.2	Blade preparations	D	Commissed / Nat	1
12.2.1	Transportation cover	Removed	Complied / Not	
	Di i C	D. I. d.	Complied / Not	
	L LIAGO MANUSTANTININA MUUMARAM	Relance to the	r compuea / Not	1
12.2.2	Blade manufacturing number (Ref.: Blade manufacturer's document)	Belongs to the same set	Compiled, 11st	1

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	rcle the applicable item in the "result"	column. In-case the sp	ecification or requireme	ent is not satisfactori
	olied, make a "punch list" and state the			
Mult	iple punch lists may be used as required	1.	p (-)	-1
		Specification/		
Item No.	Check List	Requirement	Result	Remarks
	Blade exterior	No dirt, stain and	Complied / Not	
12.2.3	Diade exterior		Compiled / Not	
12.2.3		paint coat damage		
		to the exterior	<u> </u>	
12.2.4	Blade root parts and components	No damage	Complied / Not	
12.2.1	(T-bolts, root cover, and etc.,)			
	Comment:			
13.	Installation of the blades			
13.1	#1 blade			
13.1		As ansaified in the	Complied / Not	
12 1 1	Rigging requirements and the	As specified in the	Compiled / Not	
13.1.1	location to pick-up the blade	ref. drawing	1	
	(Ref.: Dwg. N30-***-****)			
13.1.2	Final check after lifting the blade	No dirt, stain and	Complied / Not	
	from the staging area	paint coat damage		
13.1.3	Pitch change procedure	As specified in the	Complied / Not	
13.1.3	(Ref.: Dwg. N30-***-****)	ref. drawing		
40.4.4	O-ring between blade and bearing	Installed and with	Complied / Not	
13.1.4	6	grease		
	Match marks of the blade and	Aligned	Complied / Not	
13.1.5	bearing	Mighed	J	
	Hydraulic pitch cylinder of the #1	I11/D4-:	Complied / Not	
		Locked/Restrictor	Complied / Not	
13.1.6	blade after the T-bolts are inserted	valve "V-214" is		
		closed (full turn		
		clockwise)		
13.1.7	Middle portion of the #1 blade	Supported	Complied / Not	
13.1.7	after the installation			
	Initial tightening of the blade bolts	300N-m,	Complied / Not	
	with an impact wrench	In proper sequence		
13.1.8	William Impact Wilding	as specified in the		
		erection manual	<u> </u>	
12 1 0	Tuitial dialetania alian anno dia		Complied / Not	-
13.1.9	Initial tightening line marking	Yellow paint pen	•	l
	Final tension for the blade bolts	425-434kN,	Spec. complied / Not	Record,
13.1.10		In proper sequence	BOP contractor to	Tool ID:#
13.1.10		as specified in the	initial sign below for the confirmation.	Tension: <u>kN</u>
		erection manual	the continuation.	
	Line marking of the blade bolts,	Blue paint pen	Complied / Not	+
12 1 11		Pine bann ben	Compiled / Not	
13.1.11	nuts and washers after the final			
	tensioning and checking			
13.1.12	Touch-up paint for the washer of	Applied	Complied / Not	
13.1.12	the blade bolts			
	Line marking of the blade bolts,	Red paint pen	Complied / Not	
13.1.13	nuts and washers after the touch	1 .	1	
	up painting			
	Installation of the earth cable	Installed as	Spec. complied / Not	
13 1 14	(Ref.: Dwg. N30-R10-0776)	1	Spec. complica / 140t	
13.1.14	(No Dwg. Noo-N10-0770)	specified in the	1	
		reference drawing	<u> </u>	<u> </u>
	Comment:			
13.2	#2 blade			
	Rigging requirements and the	As specified in the	Complied / Not	
13.2.1	location to pick-up the blade	ref. drawing	,	
	(Ref.: Dwg. N30-***-***)	www.mg		
	Final check after lifting the blade	No dirt, stain and	Complied / Not	
13.2.2			Complica / Not	
	from the staging area	paint coat damage		<u> </u>

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	rcle the applicable item in the "result"			
	blied, make a "punch list" and state the		scription of action(s) re	equired.
Mult	iple punch lists may be used as required		T	T
Item No.	Check List	Specification/ Requirement	Result	Remarks
	Pitch change procedure	As specified in the	Complied / Not	
13.2.3	Pitch change procedure (Ref.: Dwg. N30-***-***)	ref. drawing	Compiled / Not	
	O-ring between the blade and	Installed and with	Complied / Not	
13.2.4	bearing	grease		
1005	Match marks of the blade and	Aligned	Complied / Not	
13.2.5	bearing			
	Hydraulic pitch cylinder of the #2	Locked/ Restrictor	Complied / Not	
13.2.6	blade after the T-bolts are inserted	valve "V-214" is		
13.2.0		closed (full turn		
		clockwise)		
13.2.7	Middle portion of the #2 blade	Supported	Complied / Not	
	after the installation	2007	Complied (21-4	
	Initial tightening of the blade bolts	300N-m,	Complied / Not	
13.2.8		In proper sequence as specified in the		
		erection manual		
13.2.9	Initial tightening line marking	Yellow paint pen	Complied / Not	
13.2.7	Final tension for the blade bolts	425-434kN,	Spec. complied / Not	Record.
	That tension for the blade boils	In proper sequence	BOP contractor to	Tool ID:#
13.2.10		as specified in the	initial sign below for	Tension: kN
		erection manual	confirmation.	
	Line marking of the blade bolts,	Blue paint pen	Complied / Not	
13.2.11	nuts and washers after the final	Ziao paini pon	•	
	tensioning and checking			
13.2.12	Touch-up paint for the washer of	Applied	Complied / Not	
13.2.12	the blade bolts			
	Line marking of the blade bolts,	Red paint pen	Complied / Not	
13.2.13	nuts and washers after the touch			
	up painting	2 2 2		<u> </u>
10014	Installation of the earth cable	Installed as	Spec. complied / Not	
13.2.14	(Ref.: Dwg. N30-R10-0776)	specified in the		
	Comment:	reference drawing		<u> </u>
13.3	#3 blade			
	Rigging requirements and the	As specified in the	Complied / Not	
13.3.1	location to pick-up the blade	ref. drawing		
	(Ref.: Dwg. N30-***-****)			
1222	Final check after lifting the blade	No dirt, stain and	Complied / Not	
13.3.2	from the staging area	paint coat damage		
13.3.3	Pitch change procedure	As specified in the	Complied / Not	
10.0.0	(Ref.: Dwg. N30-***-***)	ref. drawing		
13.3.4	O-ring between the blade and	Installed and with	Complied / Not	
	bearing	grease	O1:-1/27 /	
13.3.5	Match marks of the blade and	Aligned	Complied / Not	
	bearing	III/D	Complied / Not	
	Hydraulic pitch cylinder of #3	Locked/Restrictor	Complied / Not	
13.3.6	blade after the T-bolts are inserted	valve "V-214" is	1	
		closed (full turn clockwise)		İ
	Middle portion of the #3 blade	Supported	Complied / Not	
13.3.7	after the installation	Supported	- 5mp	
	the meaning of	<u> </u>	1	_t

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	rcle the applicable item in the "result"			
	plied, make a "punch list" and state the		scription of action(s) red	quired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/	Result	Remarks
	<u> </u>	Requirement		
	Initial tightening of the blade bolts	300N-m,	Complied / Not	
13.3.8		In proper sequence		
		as specified in the		
12.2.0	Y *** 1	erection manual	Complication	
13.3.9	Initial tightening line marking	Yellow paint pen	Complied / Not Spec. complied / Not	Decemb
	Final tension for the blade bolts	425-434kN,	BOP contractor to	Record, Tool ID:#
13.3.10		In proper sequence	initial sign below for	Tension: kN
		as specified in the	confirmation.	
		erection manual		
	Line marking of the blade bolts,	Blue paint pen	Complied / Not	
13.3.11	nuts and washers after the final			[
	tensioning and checking	1	O-mark 1 (3)	
13.3.12	Touch-up paint for the washer of	Applied	Complied / Not	
	the blade bolts	D. I	Committed / N-4	
13.3.13	Line marking of the blade bolts, nuts and washers after the touch	Red paint pen	Complied / Not	1
13.3.13	up painting			†
	Installation of the earth cable	Installed as	Spec. complied / Not	
13.3.14	(Ref.: Dwg. N30-R10-0776)	specified in the	Spec. complica / Not	
13.3.14	(Net.: Dwg. Noo-1/10-0710)	reference drawing		
	Comment:	Totoronce drawing		
	Comment.			
14.	Connecting the rotor head with	blades to the nacell	e	
14.1	Preparation of the rotor head with	blades		
	Temporary hydraulic unit for the	Disconnected after	Complied / Not	
14.1.1	pitch change	installing all the		
		three blades		
	Blade root checking after the	Whole area is	Checked / Not	
	installation of the earth cables	clean/ no tools and		
14.1.2	(all 3 blades)	other objects were		
		left inside the blade		
		root		
14.1.3	Cover for the blade root access	Installed	Complied / Not	
	manholes	(for all 3 blades)		
	Accumulator gas pressure	8MPa +/-	Sufficient/ Insufficient	
14.1.4	#1(ACC-211), #2(ACC-221)	8MPa +/-	Sufficient/Insufficient	
	#3(ACC-231)	8MPa +/-	Sufficient/ Insufficient	
14.1.5	Oil piping and condition inside of	No leaks/ No dirt	Accepted / Rejected	
14.1.3	the rotor head	and other debris		
	Nose cone of the rotor head	Properly installed	Spec.complied / Not	
14.1.6	capsule	as specified in the		
	(Ref.: Dwg. N30-C10-1003)	reference drawing		
	Final checking of the exterior			Report to seller if
14.1.7	-Blade,	No damage	No damage / Found	damage is found.
14.1./	-Rotor head and canopy,	No damage	No damage / Found	
	-Device installed in rotor head,	No damage	No damage / Found	
	Temporary stand for the rotor	Properly assembled	Complied / Not	
14.1.8	head	as specified in the		
	(Ref.: Dwg. 92100-0521)	reference drawing		
	Lifting lug plate for the rotor head	Properly installed/	Complied / Not	
14.1.9	and main crane rigging	crane riggings were		
		checked before use		

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	rcle the applicable item in the "result"			
	plied, make a "punch list" and state the		scription of action(s)	required.
Mult	iple punch lists may be used as required		•	
Item No.	Check List	Specification/	Result	Remarks
		Requirement		
	Tail crane rigging on the #1 blade	Properly installed	Complied / Not	
14.1.10		and with the edge		
		protector		
	When the rotor head with blade is	Transportation	Complied / Not	
14.1.11	onto the temporary stand	frame of the rotor		
		head is properly		
		fixed onto the stand		
	Comment:			
14.2	Dlada witch above to the Coathern			
	Blade pitch change to the feather p		0 1 1/37 /	
14.2.1	Site wind speed	Less than 7m/s	Complied / Not	
	Tail crane rigging on the #1 blade	Enough slack or the	Complied / Not	
14.2.2		sling is completely		
		disconnected from		
	G (1 11 11 11 11 11 11	the crane hook		
14.2.3	Supports in the middle portions of	Completely	Complied / Not	
	the blades (all three)	removed		
1101	Restrictor valves "V-214" for the	Opened/ fully	Complied / Not	
14.2.4	pitch hydraulic cylinders (3pcs)	turned counter-		
	m 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	clockwise		
	Temporary hydraulic unit	Properly installed/	Complied / Not	
14.2.5		connectors are free		
	Continue and a Calle of the 11-1-1	of contaminants	0 11 1/37	
14.2.6	Swing area of the three blades	Free of any	Complied / Not	
		obstructions		
14.2.7	Pitch change	Feather position	Complied / Not	
	Comment:			
14.3	Installation of the rotor head to the	nacelle		
14.3.1	Site wind speed	Less than 7m/s	Complied / Not	-
14.3.2	Blade pitch angle	Feather position	Complied / Not	
17.5.2	Nacelle drive train (main shaft)	Rotates freely/	Complied / Not	
	final check / confirmation before	match mark for the	Compiled/140t	
14.3.3	lifting the rotor head	rotor head is on the		
	mang me rotor nead			
	Hydraulic pitch cylinders (all 3	top most position Locked/ Restrictor	Complied / Not	
	units) condition before lifting the	valves "V-214"	Compiled/1900	
14.3.4	1 1 7			
	rotor head	were closed (full		
	Toil arong rigging on the #1 blad-	turn clockwise)	Complied / Not	
14.3.5	Tail crane rigging on the #1 blade	Properly installed	Computed / NOt	
	Toglings on the time of the #2 0 #2	with edge protector Properly connected	Complied / Not	+
14.3.6	Taglines on the tip of the #2 & #3 blades		Compiled / NOt	
		with blade socks	Complied / Not	
	Loose end of the blade taglines	Anchored to a	Complica / Not	1
14.3.7		vehicle or a		
		suitable tie off		1
	F' 1 1 1 1 C 1'C'	points	Complicat (No.	-
	Final check before lifting the rotor	Whole area and	Complied / Not	1
	head from the stand	surfaces are clean/		
14.3.8		no tools and other		
		objects were left		
		inside the rotor		
	1	head		1

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Enci	rcle the applicable item in the "result"	column. In-case the spe	ecification or requireme	ent is not satisfactori
	olied, make a "punch list" and state the		scription of action(s) re	quired.
Mult	iple punch lists may be used as required			
Item No.	Check List	Specification/	Result	Remarks
		Requirement		110111111
	Guide bar on the rotor head bolt	Installed properly	Complied / Not	
14.3.9	hole			
	(on bolt hole with match mark)			
11010	When changing the rotor head	#1 blade tip never	Complied / Not	
14.3.10	from horizontal to the vertical	touched the ground		
	position		0 1:1/21	
14.3.11	Match marks for the rotor head	Aligned	Complied / Not	
	and main shaft		0 1: 1/2)	
14.3.12	Rotor head connecting bolts	Properly installed	Complied / Not	
	(stud bolts)	and with lubricant	0 1: 1/22	
	Initial tightening of the rotor head	300N-m,	Complied / Not	
14.3.13	stud bolts	In proper sequence		
		as specified in the		
14011	X 1	erection manual	C1:-1 (N-4	
14.3.14	Initial tightening line marking	Yellow paint pen	Complied / Not	
	Gear motor on the high speed	Installed	Complied / Not	
14.3.15	shaft	immediately after	1	
	(Ref.: Dwg. N30-G10-0418)	connecting the		
	Final tension for the rotor head	rotor head	Spec. complied / Not	Record.
	stud bolts	695-700kN,	BOP contractor to	Tool ID:#
14.3.16	stud boits	In proper sequence as specified in the	initial sign below for	Tension: kN
		erection manual	confirmation.	
	Line marking of the rotor head	Blue paint pen	Complied / Not	
14.3.17	stud bolts, nuts and washers after			
	the final tensioning and checking			
14.3.18	Touch-up paint for the washer of	Applied	Complied / Not	
	the rotor head stud bolts			
	Line marking of rotor head stud	Red paint pen	Complied / Not	
14.3.19	bolts, nuts and washers after the			
	touch up painting	D	01:-4 (37.)	
	Rotor head lifting lug cover	Properly installed/	Complied / Not	
14.3.20	(hinged fiberglass cover of the	bolts were fully		
	rotor head) after the removal of	tightened		
	Crane rigging	Dunnaula installad	Spec. complied / Not	
14221	Rotor head hydraulic piping (Ref.: Dwg. N30-A10-1357)	Properly installed as specified in the	Spec. complica / Not	
14.3.21	(Not., Dwg. Not-A10-1307)			
	Restrictor valves "V-214" for the	reference drawing Opened/ fully	Complied / Not	
	pitch hydraulic cylinders (3pcs)	turned counter-	Compiled / Not	
14.3.22	after connecting the hydraulic	clockwise		
	piping	OTOCK WISC		
	Visual check before leaving the	Whole area is	Complied / Not	
	inside of rotor head	clean/ no tools and	Compiled / I tot	
14.3.23	inside of fotol fleat	other objects were		
17.3.43		left inside the rotor		
		head		
	Earth/ grounding brush	Installed as	Spec. complied / Not	
14.3.24	(Ref.: Dwg. N30-R10-0735)	specified in the	Spec. complica / 140t	
17.3.24	(1.0 Dag. 1100-1110-0100)	reference drawing	1	
	•	i icicicnee diawing	1	1

Date:	Checked by	у		Page /
comp	rcle the applicable item in the "result" olied, make a "punch list" and state the iple punch lists may be used as required	item number and the de		ent is not satisfactori
Item No.	Check List	Specification/ Requirement	Result	Remarks
14.3.25	Rotor speed sensor assembly (Ref.: Dwg. N30-A10-1373)	Installed as specified in the reference drawing	Spec. complied / Not	
14.3.26	Main bearing cover assembly (Ref.: Dwg. N30-A10-1373)	Installed as specified in the reference drawing	Spec. complied / Not	
14.3.27	Taglines on the blade tip	Removed by running the turning device (gear motor)	Complied / Not	
	Comment:			
15.	Installation of the high speed sh	naft coupling	1	
15.1	Setting the coupling hub alignmen			
15.1.1	Alignment of the gearbox and generator coupling (Ref.: Dwg. N30-G10-0422) #1 blade: @ 0 deg. or at top most position Nacelle: Facing the dominant wind direction Note: • Pt. A = @ zero deg. (top most) of generator coupling hub being viewed from the rotor head. • Pt. B = @ 90 deg. to the left of "Pt. A" being viewed from the rotor head. • Pt. C = @ 180 deg. (opposite) of "Pt. A" being viewed from the rotor head. • Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. • Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. • Ensure that all measured points are clean and not rusty. • Mark each point with a permanent pen.	■Distance of the flange face at Pt. A when zero reading of dial indicator is set: D = 700±0.5mm ■Allowable run-out of coupling flange face: Pt. A: ±10 Pt. B: ±10 Pt. D: ±10 ■Required run out (radial eccentricity) of coupling hub: Pt. A: ±10 Pt. B: -50 to -70 Pt. C: -50 to -70 Pt. D: ±10 Note: Run-out values are the actual reading of a 0.01mm graduation dial gauge	Spec.complied / Not BOP contractor to initial sign below for confirmation.	■Measured distance of flange face at Pt. A when zero reading of dial indicator is set: D =mm ■Measured run-out of coupling flange face: Pt. A: Pt. B: Pt. C: Pt. D: ■Measured run-out (radial eccentricity) of coupling hub:: Pt. A: Pt. B: Pt. C: Pt. D:

Date:	ON WORK RECORD / CHECK ST Checked b			Page /
Note:	rcle the applicable item in the "result"		ecification or requireme	<u> </u>
comp	olied, make a "punch list" and state the iple punch lists may be used as required	item number and the de		
Item No.	Check List	Specification/	Result	Remarks
15.1.2	Alignment of the gearbox and generator coupling (Ref.: Dwg. N30-G10-0422) #1 blade: @ 90 deg. or horizontal position Nacelle: Facing the dominant wind direction Note: Pt. A = @ zero deg. (top most) of generator coupling hub being viewed from the rotor head. Pt. B = @ 90 deg. to the left of "Pt. A" being viewed from the rotor head. Pt. C = @ 180 deg. (opposite) of "Pt. A" being viewed from the rotor head. Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. Ensure that all measured points are clean and not rusty. Mark each point with a permanent pen.	Requirement Distance of the flange face at Pt. A when zero reading of dial indicator is set: D = 700±0.5mm Allowable run-out of coupling flange face: Pt. A: ±10 Pt. B: ±10 Pt. D: ±10 Required run out (radial eccentricity) of coupling hub: Pt. A: ±10 Pt. B: -50 to -70 Pt. C: -50 to -70 Pt. D: ±10 Note: Run-out values are the actual reading of a 0.01mm graduation dial gauge	Spec.complied / Not BOP contractor to initial sign below for confirmation.	Measured distance of flange face at Pt. A when zero reading of dial indicator is set: D =mm Measured run-out of coupling flange face: Pt. A: Pt. B: Pt. C: Pt. D: Measured run-out (radial eccentricity) of coupling hub:: Pt. A: Pt. B: Pt. C: Pt. D:
15.1.3	Alignment of the gearbox and generator coupling (Ref.: Dwg. N30-G10-0422) #1 blade: @ 180 deg. or at the lowest position Nacelle: Facing the dominant wind direction Note: Pt. A = @ zero deg. (top most) of generator coupling hub being viewed from the rotor head. Pt. B = @ 90 deg. to the left of "Pt. A" being viewed from the rotor head. Pt. C = @ 180 deg. (opposite) of "Pt. A" being viewed from the rotor head. Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. Ensure that all measured points are clean and not rusty. Mark each point with a permanent pen.	■Distance of the flange face at Pt. A when zero reading of dial indicator is set: D = 700±0.5mm ■Allowable run-out of coupling flange face: Pt. A: ±10 Pt. B: ±10 Pt. D: ±10 ■Required run out (radial eccentricity) of coupling hub: Pt. A: ±10 Pt. B: -50 to -70 Pt. C: -50 to -70 Pt. D: ±10 Note: Run-out values are the actual reading of a 0.01mm graduation dial gauge	Spec.complied / Not BOP contractor to initial sign below for confirmation.	■Measured distance of flange face at Pt. A when zero reading of dial indicator is set: D =mm ■Measured run-out of coupling flange face: Pt. A: Pt. B: Pt. C: Pt. D: ■Measured run-out (radial eccentricity) of coupling hub:: Pt. A: Pt. B: Pt. C: Pt. D:

Date:	ON WORK RECORD / CHECK SI Checked by			Page /
comp	cle the applicable item in the "result" blied, make a "punch list" and state the	column. In-case the spe item number and the de		ent is not satisfactoril
Mult Item No.	iple punch lists may be used as required Check List	Specification/	Result	Remarks
	Alignment of the gearbox and	Requirement		1
15.1.4	generator coupling (Ref.: Dwg. N30-G10-0422) #1 blade: @ 270 deg. Nacelle: Facing the dominant wind direction Note: Pt. A = @ zero deg. (top most) of generator coupling hub being viewed from the rotor head. Pt. B = @ 90 deg. to the left of "Pt. A" being viewed from the rotor head. Pt. C = @ 180 deg. (opposite) of "Pt. A" being viewed from the rotor head. Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. Pt. D = @ 90 deg. to the right of "Pt. A" being viewed from the rotor head. Ensure that all measured points are clean and not rusty. Mark each point with a permanent pen.	■Distance of the flange face at Pt. A when zero reading of dial indicator is set: D = 700±0.5mm ■Allowable run-out of coupling flange face: Pt. A: ±10 Pt. B: ±10 Pt. D: ±10 ■Required run out (radial eccentricity) of coupling hub: Pt. A: ±10 Pt. B: -50 to -70 Pt. C: -50 to -70 Pt. C: -50 to -70 Pt. D: ±10 Note: Run-out values are the actual reading of a 0.01mm graduation dial gauge	Spec.complied / Not BOP contractor to initial sign below for confirmation.	■Measured distance of flange face at Pt A when zero reading or dial indicator is set: D =mmm ■Measured run-out of coupling flange face: Pt. A: Pt. B: Pt. C: Pt. D: ■Measured run-out (radial eccentricity) of coupling hub:: Pt. A: Pt. B: Pt. C: Pt. D:
15.1.5	Note: Sum up the measured values for each position of the #1 blade (0, 90, 180, 270 deg.) then divide it by four to get the average.	■Allowable run-out of the coupling flange face: Pt. A: ±10 Pt. B: ±10 Pt. C: ±10 Pt. D: ±10 ■Required run out (radial eccentricity) of the coupling hub: Pt. A: ±10 Pt. B: -50 to -70 Pt. C: -50 to -70 Pt. D: ±10	Spec.complied / Not BOP contractor to initial sign below for confirmation.	■Computed run-out of the coupling flange face: Pt. A: Pt. B: Pt. C: Pt. D: ■Computed run-out (radial eccentricity) of the coupling hub:: Pt. A: Pt. B: Pt. C: Pt. D:
15.1.6	Installation of the flexible coupling assembly (Ref.: Dwg. N30-G10-0422)	Properly installed as specified in the reference drawing	Spec. complied / Not	
15.1.7	Final torque for the generator mounting bolts	3395-3495N-m, with lubricants, red paint pen mark is applied	Spec. complied / Not BOP contractor to initial sign below for confirmation.	Record, Tool ID:# Torque:kN-m
15.1.8	Final torque for the flexible coupling mounting bolts	180N-m, with "Loctite 2701", red paint pen mark is applied	Spec. complied / Not BOP contractor to initial sign below for confirmation.	Record, Tool ID:# Torque:kN-m

Date:	Checked by	y		Page /
Note:				
Encir	cle the applicable item in the "result"	column. In-case the spe	cification or requireme	nt is not satisfactor
	lied, make a "punch list" and state the i		scription of action(s) rec	quired.
Mult	ple punch lists may be used as required			I
Item No.	Check List	Specification/	Result	Remarks
	Y	Requirement	Spec. complied / Not	
	Installation of the coupling cover	Properly installed	spec. complied / Not	
	assembly (Ref.: Dwg. N30-A10-0325)	as specified in the reference drawing/		
15.1.9	(Rel.: Dwg. N30-A10-0323)	all the bolts were		
13.1.7		fully tightened and		
		with red paint pen		
		mark		
	Comment:	III WIN		
				,
16.	Miscellaneous activities			
16.1	Final check in the rotor head			
	Electrical cables	Properly installed	Confirmed/ Not	
16.1.1		and fixed/ no		
		damaged		
	Hydraulic piping connections	Properly installed	Confirmed/ Not	
16.1.2		no leaks/ no		
	C1	damaged Visually clean/ no	Confirmed/ Not	
16.1.3	General appearance	dirt and oil spill/ no	Commined/ Not	
		tools left inside		
	Manhole covers	Installed/ bolts	Confirmed/ Not	
16.1.4	Walifiole Covers	were fully	Committee	İ
10.1.7		tightened		
	Comment:	Lightoneu	·	
				γ
16.2	Around the nacelle	T		
4604	Electrical cables	Properly installed	Confirmed/ Not	
16.2.1		and fixed/ no		
	YY 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	damaged	Confirmed/ Not	
16.2.2	Hydraulic piping connections	Properly installed no leaks/ no	Confirmed/Not	
10.2.2				
	All connecting and mounting bolts	damaged Fully tightened and	Confirmed/ Not	
16.2.3	An connecting and mounting boils	with red pain pen	Committee Not	
10.2.3		mark		
	All access hatch	Closed and	Confirmed/ Not	
16.2.4		properly fixed/ no		1
1		damage		
	Turning device	Placed into standby	Complied / Not	
	(gear motor)	position (gear is		
16.2.5	•	not engaged) after		
		completing the		
		assembly activities		
	General appearance	Visually clean/ no	Confirmed/ Not	
16.2.6		dirt and oil spill/ no		
		tools left inside		
16.2.7	Manhole/ access covers	Closed/ bolts were	Confirmed/ Not	
10.2.7		fully tightened		

Date:	Checked	by		Page /
comp	cle the applicable item in the "result lied, make a "punch list" and state the ple punch lists may be used as requir	e item number and the de		
Item No.	Check List	Specification/ Requirement	Result	Remarks
16.3	Inside the tower			
16.3.1	Tower lights	Properly installed and fixed/ bolts were fully tightened and with red pain pen mark	Confirmed/ Not	
16.3.2	All electrical cables	Properly installed and fixed/ no damaged	Confirmed/ Not	
16.3.3	All electrical cable connections	Properly connected	Confirmed/ Not	
16.3.4	All tower connecting bolts	Fully tightened and with red pain pen mark	Confirmed/ Not	
16.3.5	All connecting bolts that needs touch-up paint	Properly painted	Confirmed/ Not	
16.3.6	All tower earth/ ground cables	Properly installed/ bolts were fully tightened and with red pain pen mark	Confirmed/ Not	
16.3.7	General appearance inside the tower	Visually clean/ no dirt and oil spill/ no tools left inside	Confirmed/ Not	
	Comment:			

The dielectric test for medium voltage line on the applicable parts in the WTGs shall be also completed by Owner before commissioning.

The following persons verify that the record of erection checks has been completed satisfactory, with the exception of the items detailed on the Punch List.

ne following persons i	nave witnessed the erection check and agreed with the result of
VTG No.:	<u></u>
As Project company	
	Name:
As Sub-Contractor res	sponsible for Erection, Installation.
	Name:
Mitsubishi Power Sys As Seller	tem, Inc.:
	Name:

EXHIBIT - K

[FORM OF] COMMISSIONING CERTIFICATE

Wind Turbine No: (the "WTG")
Date:
1. Capitalized terms used herein have the meaning set forth in the Appendix I ("Definitions") to the Wind Turbine Generators Supply Agreement, dated as of, 2008 ("Supply Agreement"), by and between Babcock & Brown Infrastructure Group US LLC, as Owner ("Owner"), and Mitsubishi Power Systems Americas, Inc., as Seller (the "Seller").
2. Seller has delivered this certificate, completed except for signature of Owner, to Owner's duly authorized representative on the date first set forth above.
3. Seller certifies and represents, with respect to the WTG referenced above, that the following statements are true as of the date set forth above:
(a) Commissioning of the WTG has been conducted and has met or exceeded the requirements set forth in the Commissioning Procedures;
(b) Mechanical Completion of the WTG has occurred;
(c) The Commissioning Procedures for such WTG have been successfully completed and the Commissioning Check Sheet has been completed and signed by Seller;
(d) The WTG is ready for initial operation in accordance with the O&M Procedures Manual.
[Remainder of Page Intentionally Blank.]

 ${\it Exhibit-K} \ \ {\it Form\ of\ Commissioning\ Certificate}$

The persons signing below are authorized to sub	omit this certificate to Owner for and on behalf of Seller.
Mitsubishi Power Systems Americas, Inc., as	Seller
Ву:	Date:
Name:	_
Title:	-
Acknowledged and agreed by the undersigne countersign this certificate for and on behalf of 0	d, who hereby certifies that he or she is authorized to Owner.
Babcock & Brown Infrastructure Group US,	LLC, as Owner
Ву:	Date:
Name:	
Title:	
Meter read prior to Commissioning of WTG	
Meter read at time of Commissioning of WTG	
DateTime	
Owner's acknowledgement signature of meter re	eading

Exhibit - K Form of Commissioning Certificate

EXHIBIT - L

[FORM OF] SUBSTANTIAL COMPLETION CERTIFICATE

1.	Capitalized terms used herein have the meanings set forth in Appendix I to the Wind Turbine
	Generators Supply Agreement, dated, 2008 (the "Supply Agreement"), by and
	between Mitsubishi Power Systems Americas, Inc., as seller ("Seller") and Babcock & Brown
	Infrastructure Group US LLC, as owner ("Owner").

- 2. Seller has delivered this certificate, completed except for signature by Owner, to Owner's duly authorized representative on the date first set forth above.
- 3. Seller certifies and represents that the following statements are true as of the date first set forth above:
 - (i) All of the [insert either, "Base Turbines and the Transfer" or "Additional", as applicable] Turbines and all Wind Turbine Work with respect to the [insert either "Base Turbines and the Transfer Turbines" or "Additional Turbines", as applicable] performed through such date has been performed, except as provided in the Punch List, in accordance with the Requirements, and Seller is not aware of any conditions that would otherwise entitle Owner upon Substantial Completion of the [insert either "Base Turbines and the Transfer Turbines" or "Additional Turbines", as applicable] to Warranty Repair or Warranty Retrofit under the Warranty Agreement except as set forth on the Punch List;
 - (ii) Seller has completed Commissioning with respect to all of the [insert either "Base Turbines and the Transfer" or "Additional", as applicable Turbines;
 - (iii) The Commissioning Procedures attached to the Supply Agreement as Exhibit M-1 have been met or exceeded;
 - (iv) Seller has completed all of the Wind Turbine Work with respect to the [insert either "Base Turbines and the Transfer Turbines" or "Additional Turbines", as applicable], to be provided under the Supply Agreement, other than any Punch List items;
 - (v) Seller has prepared and submitted to Owner the Punch List for the [insert either "Base Turbines and the Transfer Turbines" or "Additional Turbines", as

Exhibit - L Form of Substantial Completion Certificate

DATE:_

applicable];

- (vi) Owner has received a conditional waiver and release, in the form specified in Exhibit-U-1, upon progress payment, of all liens, security interests or encumbrances that Seller or any of its subcontractors may have against Owner, the Project and the Site to the extent that payments have been received by Seller under the Supply Agreement;
- (vii) Seller and Owner have entered into the Escrow Agreement and Seller has deposited the Escrow Items with Escrow Agent;
- (viii) With respect to Substantial Completion of the Base Turbines and the Transfer Turbines, Seller has delivered to Owner a general list of the types and recommended quantities of the Spare Parts;
- (ix) A stock of Spare Parts for the [insert either "Base Turbines and the Transfer" or "Additional", as applicable] Turbines is in storage at the Site or Seller's storage facilities at Mojave, California; and
- (x) Seller has issued and delivered to Owner for its countersignature this Substantial Completion Certificate in accordance with the provisions of Section 9.3(e).
- The person signing below is authorized to submit this certificate to Owner for and on behalf of Seller.

Mitsubishi Power Systems Americas, Inc.

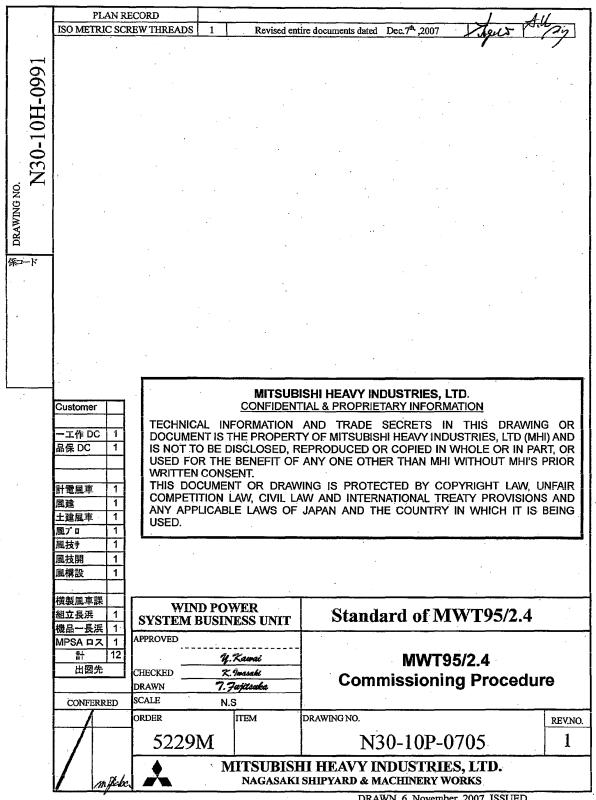
Acknowledged and agreed by the undersigned, who hereby certifies that he or she is authorized to countersign this certificate for and on behalf of Owner:

Babcock & Brown Infrastructure Group US LLC

By:	
Name:	
Title:	

Exhibit - L Form of Substantial Completion Certificate

Exhibit M - Commissioning Procedures and Check Sheet



DRAWN 6 November 2007 ISSUED

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🕺 MITSUBISHI HEAVY INDUSTRIES, LTD.

1. INTRODUCTION

1.1 General

This document describes the commissioning procedure for MWT95/2.4 wind turbine to be performed during WTG construction period.

With regard to the wind turbine installed at the project site, grid coupling test and other safety function tests will be executed.

Basically this procedure is applied to be carried out by the commissioning personnel supported by technical advisor of WTG manufacture. The technical advisor shall evaluate the personnel's skill and capability to manage this task.

1.2 Safety Notice

When stop commissioning work incompletely for lunch or at end of the day, keep wind turbine to the following safety states.

- (1) Blade should be at feathering position and shaft in no locked condition. (If calm wind (Ave.15m/s or less), it is O.K. to apply high speed locking pin).
- (2) Yawing to 90 degree toward the dominant wind direction after yaw drive adjusted.

2. MWT92(95)/2.4 SPECIFICATION

(1) Wind Turbine Type

(1)	will a furbine type			
	Туре	MWT95/2.4		
	Manufacture	MHI		
(2)	Performance			
	Rated Output	Pel = 2400kW		
	Cut-in Wind Speed	3.0 (m/s)		
	Rated Wind Speed	12.0 (m/s)		
	Cut-out Wind Speed	25.0 (m/s) (30m/s : Inst	antaneous)	
	Reset of Cut-out	20.0m/s		
	Design Maximum wind Speed	70.0 (m/s) (Instantaneo	us)	
	Control strategy	Full span pitch regulation	n	
	Yaw System	Active Control		
(3)	Rotor			
	Number of Blade	3		
	Diameter	95 (m)	·	
	Rotational Speed	9.0 – 16.9 (rpm) rated 15rpm		
	Rotational Direction	Clockwise (as viewed from windward)		
	Orientation	Upwind		
	Cone Angle	-2 (deg)		
	Tilt Angle	5 (deg)		
(4)	Blade			
	Length	46.2 (m)		
	Material	GFRP		
	Airfoil	NACA 63.4XX		
	Twist	20.803 (deg)		
	Chord Length			
	- Tip	3513 (mm)		
	- Root	1136 (mm)		
(5)	Gear Box			
	Туре	Planetary & 2- Stage Par		
	Gear Ratio	1:76.7 (50Hz)	1:90.6 (60Hz)	
	Rating(Output)	2500 kW (50/ 60Hz)		
	Rotational Speed			

(6)	Generator
(0)	Generator

- High Speed Shaft

- Low Speed Shaft

Туре	Three phase asynchrono	Three phase asynchronous generator with wound rotor			
Rated Capacity	2520kW				
Power Factor	0.9 inductive \sim 0.95	0.9 inductive \sim 0.95 capacitive			
Number of Poles	6	6			
Rated Speed	1451rpm(50Hz),	1359rpm(60Hz)			
Slip ratio	-11.5%(50Hz)	-13.3%(60Hz)			
Frequency	50 (Hz)	60(Hz)			
Voltage	690 (v)				
Enclosure & Protection	Totally-Enclosed-Air-to	-Air-Cooling (IP54)			
Rotor Type	Wound Rotor	Wound Rotor			
Insulation	Н				
Rating	Continuous	Continuous			

1154rpm

at rated speed (50Hz)

15 rpm at rated speed

1359rpm

at rated speed (60Hz)

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Base Diameter

(excluding tower bottom flange)

(7)	Brake			
. ,	Aerodynamic Brake	Blade Feather	ing	
	Service Brake	Disk Brake (Hi	gh Speed Shaft)	
(8)	Tower			
	Туре	Taper Mono-po		
	Hub Height	70m	80m	N80m
	Top Diameter	3m	3m	3m
	(excluding, tower top flange)			

4m

4.8m

4.24m

3. Checks before commissioning

3.1 Pre-commissioning

The commissioning work shall be done according to this procedure.

Generally, the commissioning work is executed connected to grid network.

If the grid network connection is postponed, the commissioning cannot proceed as on this document by lack of electricity.

In that case, use the DG(Diesel Generator) to continue the commissioning.

3.2 Mechanical completion certificate

Commissioning can not be started before checking mechanical completion certificate which verifies the completion of all construction work.

4. Drawing

4.1 Control Oil System

Piping & Instrument Diagram: N30-10P-0635 (Power Pack Drawing: "HAWE" A6048S20)

4.2 Lubricating Oil System

Piping Instrument Diagram: N30-10P-0625

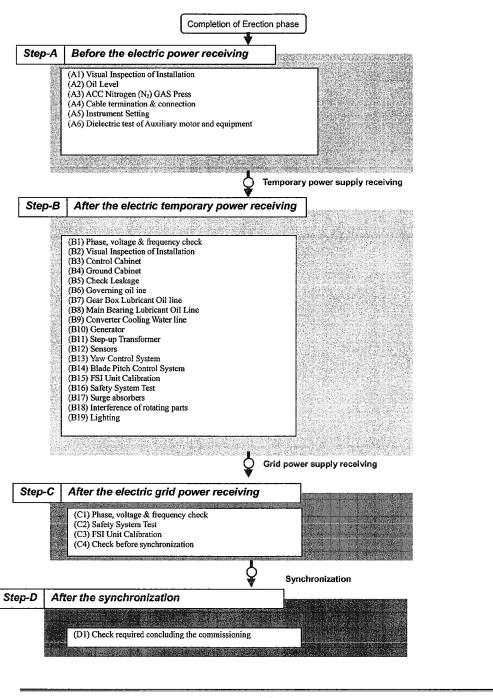
4.3 Single Line Diagram

Single Line Diagram: 66800-7011

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5. Working Steps of Commissioning

The commissioning process is shown from next page according to the outline steps shown below.



6

Commissioning Test Procedure (1/13)

No. Step	Test item A. Before Ele	Confirmation rolling	Procedure:	Giffaria	Remarks	For Safety
A1	Visual Inspection of Installation		Visual check the tightening of structural boils and review the erection record. (a) Blade connecting boils (b) Hub connecting boils (c) Tower-Yaw module connecting boils (d) Tower middle flange boils (e) Tower internal ladder installation (f) Boils for tower and Ground Cabinet	No looseness bolt connection. +High speed coupling bolts -Rear frame bolts -Yaw connecting upper bolts	Accordingly visual checking only for	In case of working on the air, wear safely belt. There is a possibility of death or fatal Injurary.
			Inspect fatal damages or failures on the following main components by visual check: (a) Blades (b) HUB (c) Nacelle (Yaw Module, Rear Module, Drive Train, Gear Box, Generator, machine foundation, Cabinets, and the other components in nacelle.) (d) Tower (e) Ground Cabinet enclosure & doors (f) Safety features, tower nacelle and Hub (g) Electric cables, fluid and hydraulic hoses (h) Opening & dosing of Nacelle hatch. (i) Other parts	wind turbine.		In case of working on the air, wear safety beit. Never touch the rotating object. There is a possibility of death or fatal injure.
A2	Oil Level		(b) YAW gearbox oil Havel (c) G.O. Hydraulic unit tank oil level (d) L.O. for Main bearing unit tank oil level	(a) Gearbox oil level: to be center line of left side of gauge (b) YAW gearbox oil level: between shown two lines Of the BOTTOM BOTTOM	the criteria.	In case of working on the air, wear safely belt. There is a possibility of death or fatal injure.
				(c) G.O. Hydraulic unit tank oil level: between "High Oil Level at Depressurized ACC" & 60mm under this line (d) L.O. for Main bearing unit tank oil level: between "Max Oil Level and operation oil level"		
А3	ACC GAS Press	(7) Check N2 gas press in ACC	Check the accumulator N2 gas pressure and charge gas if the pressure is less than the specific value: - ACC-101: PT-102 - ACC-102: PT-103 - ACC-211,221,231: PT-212, 222, 232	-ACC-101: 13MPa to 14MPaACC-102: 17MPa to 18MPaACC-211,221,231: 10 MPa to 11MPa.	(ACC-101,102,211,221,231) shall be	Do not Inhale the Nitrogen gas. There is a possibility of fatal damage on the brain or cause death

Commissioning Test Procedure (2/13)

No,	Test Item	Confirmation points	Proceedings	Le Critoria	Remarks	For Safety
A4	Cable termination & connection	(1) Chack cable boits condition	Check the following cable bolts condition: (a) Grounding cable bolts (Top Control/ Converter/ Top Power/ Hub/ Ground) (b) 690V/230V cable bolts (Top Control/Ground) (c) High Voltage cable bolts (Transformer/SWGR)	No looseness connection.		Do not touch the cables with electricity. There is a possibility of fatal damage or death.
		(2) Check cable termination & connector looseness	Check that the cable terminations are not loose and all connections of the cable joints are tightened.	No looseness connection.		Do not touch the cables with electricity. There is a possibility of fatal damage or death.
		(3) Check damage of electrical components	(a) Check damage of the component parts (b) Make sure that all exposed live parts are covered with the protections (c) Parts in the control panel are installed properly especially the sockets and the braces of the relays	No damage		Do not touch the cables with electricity, There is a possibility of fatal damage or death.
		(4) Wiring check	Make sure that the wiring is connected as specified in the reference drawing.	Accordance with the electrical drawing.		Do not touch the cables with electricity. There is a possibility of fatal damage or death.
A5	Setting	(1) Adjust the instrument settings	Check Q8, Q5, Q2, Q8 in the TOP control cabinet is disconnected. Adjust the following settings of the instruments and the protection. KS2T: On Delay Timer (Top Control) KT1, KR330A: Off Delay Timer (Top Control) K50: One shot output (Top Control) K108: Off Delay Timer (Hub) BT1: Thermostal (Top Control/Converter/Top Power/Hub/Ground) RT1: hygrostal (Converter) -HT1: Hygrostal (Converter) -CT: Thermal Relay (Top Control/Converter/Hub) -CR: Cover Current Relay (Switch Gear): depending on customer GFR: Earth Leakage Relay (Transformer) -QSD: Over Speed Detector (Top Control) -Q8/Q5/Q2/Q9: Cimuit Breaker (Top Control)	In accordance with instrument Setting List		in case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
		(2) Check Top PLC and Hub PLC.	Confirm Setting of jumper pin & switch in Top PLC and Hub PLC.	In accordance with Instrument Setting List	To be configned by PLC supplier.	in case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal Injure.

Commissioning Test Procedure (3/13)

No Test Hem is	Confirmation points	Procedure 100 and 100	Criteria II	Remarks (1994)	4. For Safety
A6 Dielectric Test of Auxiliary motor and equipment	,	Measure insulation resistance of the following auxiliaries using 500VDC megger: (a) Generator terminal - ground (b) Slee up transformer terminal - ground (c) No.1 YAW Motor terminal - ground (c) No.1 YAW Motor terminal - ground (e) No.3 YAW Motor terminal - ground (g) Co.3 YAW Motor terminal - ground (g) G.O. Pump Motor terminal - ground (g) G.O. Pump Motor terminal - ground (j) Main Bearing L.O. Pump Motor terminal - ground (j) Main Bearing L.O. Pump Motor terminal - ground (j) Main Bearing L.O. Pump Motor terminal - ground (j) Main Bearing L.O. Pump Motor terminal - ground (j) Main Bearing L.O. Pump Motor terminal - ground (j) Gear Box L.O Pump A Motor terminal - ground (j) Gear Box L.O Pump B Motor terminal - ground (j) Gener Box L.O Cooler B Motor terminal - ground (o) Converter Cooling Water Cooler Fan Motor terminal - ground (o) Converter Cooling Water Cooler Fan Motor terminal - ground (g) Generator Inner Cooling Fan A Motor terminal - ground (g) Generator Unter Cooling Fan B Motor terminal - ground (g) Generator Outer Cooling Fan Motor terminal - ground (g) Generator Outer Cooling Fan B Motor terminal - ground (g) Gear Box L.O. Heater - ground (g) Gear Box L.O. Heater - ground (g) Main Bearing L.O. Heater - ground	SM-ohm ormore	1	Do not touch the cables with electricity. There is a possibility of fatal damage or death.

Commissioning Test Procedure (4/13)

UTION: During red		Fop Converter cabinet, especially 690 voltage line and high voltage line and s , all people in and on the turbine shall be noticed. rial terminal on the Ground Cabinet.	o on When electrical system is energized.	
Phase, voltage & frequency check	(1) Measurement of incoming voltage	(a) Check all breaker in the control cabinet is disconnected. (b) In Top Convortor Cabinot, connoct C2 breaker. (c) And measure the voltage between the phases at the following terminals of downstream side of F62. Confirm the incoming voltage is 690Vac±10%. - R-S: F62. between terminals 2 & 4 - T-R: F62, between terminals 4 & 6 - T-R: F62, between terminals 6 & 2 (d) Measure the voltage between the terminals 2, 3, 4 (R, S, T) of downstream side of F62 and ground. And confirm the voltage is 398V±10 %. - between terminals 3 of F62 and earth bar - between terminals 3 of F62 and earth bar - between terminals 4 of F62 and earth bar (e) At the same time, read the CCU detected voltage value using Operation Terminal (OT) and record.	(c) -R-S: 690499Vac -S-T: 690469Vac -T-R: 690469Vac (d) -R- earth bar: 398±39.8Vac -S- earth bar: 388±39.8Vac -T- earth bar: 398±39.8Vac	Do not touch the cables with electr There is a possibility of fatal damag death.
	(2) Measurement of incoming frequency.	(a) Measure the frequency at the terminals 2, 3, 4 (R, S, T) of downstream side of F62,and check the incoming frequency is within 6045Hz. (b) At the same time, read the CCU detected voltage value using Operation Terminal (OT) and record.	60 ± 5H≥	Do not touch the cables with electr There is a possibility of fatal dama death.
	(4) Measurement of power supply voltage	Measure following power supply voltage: (a) UPS output (Ground) (b) G1/G2/G3 (Top Control) (c) G1/G2/G4 (Hub) (d) G1 (Ground) (e) UPS Cablinet	(a) 230Vac:23V (b) 24.0Vda +0.5F-0V (c) 24.0Vda -0.5F-0V (d) 24.0Vdc +0.5F-0V (e) 120Vdc ± 12V	Do not touch the cables with elect There is a possibility of fatal dama death.

Commissioning Test Procedure (5/13)

No.	Test Item	Confirmation points	Procedure to NeAr 1931 18	Criferia Ramarke	For Safety
B2			Inspect nacelle for corrosion, weld spot and paint damage. Confirm Hub bolts and Tower Bolts are painted.	No corrosion, weld spot and paint damage. If it is, record the points and repair it.	In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal
		(2) Recording serial number of main components	Check serial number of main components	(Fill in the coversheet of commissioning check sheet)	In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal
B3	Contro! Cabinet	(1) Confirmation of PLC and CCU start- up	(a) Confirmation of CCU start-up (b) Confirmation of TOP PLC start-up (c) Confirmation of HUB PLC start-up or TOP/HUB communication condition	- CCU LED Indicates "88". - Top PLC's LED Indicates "8". - HUB PLC's LED Indicates "8" Or TOP/ HUB Communication is correct(No alarm and U51 operating.	in case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
		(2) Check and adjust setting of PLC	(a) Communication setting (IP address) as per customer's instruction (b) Calendar setting (Date, Time) (c) Columnar wind (if necessary) as per customer's instruction (d) Memory clear	(a)As per Customer's instruction (b) Local current date and time (c) As per Customer's instruction (d) Memory is cibared.	In case of working on the air, wear safety beit. Never touch the rolating object. There is a possibility of death or fatal injure.
B4	Ground Cabinet	(1) Communication check of operation terminal	Confirm updating of the display screen data of Operation Terminal in Ground Cabinet.	Check cisplay data	In case of working on the air, wear safety belt, Never touch the rotating object. There is a possibility of death or fatal
			Connect maintenance tool to Ground Cabinet, and confirm online monitoring function of PLC.	Check display data	In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal
B5		(1) Check leakage visually at all plugs, hoses, fittings and rotating shaft seals.	(a) Cestbox (b) Gear coupling (c) Main bearing (d) Oil piping joints (pressure gauge panel, tank, etc.) (e) Rotor hub hydraulics and rotary joint (f) L.O Coolers and Inlet / Outlet piping, Pipe protection or insulation to be fitted, if necessary. (g) Fine Fitter and Piping, suction valve to be opened. (h) Water Coolers	No leakage	in case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.

Commissioning Test Procedure (6/13)

No.	Test Item	a Contirmation points	Procedure 70.9 %	Crieria	Remarks	For Safety
B6	Governing Oil Line	(1) Check rotating direction of G.O Pump Motor (OP-101)	Confirm G.O. pump rotates in the specified direction. (In an instant) (a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive G.O. pump motor.	Same direction as arrow put on motor No abnormal noise.		In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
		(2) Check rotating direction of G.O Cooling Pump (C-101)	Confirm G.O. cooler rotates in the specified direction. (a) Turn on the circuit breaker and contextor manually by handy operating terminal to drive G.O cooler motor according to the request from mechanical advisor.	Same direction as arrow put on motor No abnormal noise,		In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
		(3) Check Oil pressure of G,O, Pump	Confirm the oil pressure (PT-101)rises to the specified level:	more than 27.5±0.5MPa,		In case of working on the air, wear safety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
	į	(4) Check Oil Leakage	Check leakage at all plugs, hoses, fittings and rotating shaft seals,	No oil leakage		In case of working on the air, wear salety belt. Never touch the rotating object. There is a possibility of death or fatal injure.
		(5) Rod length of Boosters Adjustment	(a) Service Brake Ecoster If rod length is out of the required range, adjust the booster length, (b) Yaw Brake Booster If rod length is out of the required range, adjust the booster length.	[Service Brake] At Brake on: 200±5mm [Yaw Brake] At Brake on: 150±5mm		Do not touch the moving object. There is a possibility of fatal injure.
		(6) Service Brake Check	(a) Activate check Activate check Activate the service brake at the service brake switch-A or B and release it after making sure the blade feathering position. (b) Release check Repeat (a) some times with checking rotor fixed and gap between brake pads and brake disk.	(a) Stop rotor (b) Gap; from 2.5 -0.85mm to 2.5 +1.10mm	Before service brake control, G.O. system shall be checked and G.O. system will be operated correctly.	Make sure blade is in feathering position. Do not touch the rotating object. That may cause falal injury.
İ	Gear Box Lubricant Oil line	(1) Check rotating direction of L.O Pump Motor (OP-303, 305)	Confirm L.O. pumps rotate in the specified direction. (OP-303,305) (a) Tum on the circuit breaker and contactor manually by handy operating terminal to drive Gearbox L.O. pump motor.	Same direction as arrow put on motor No abnormal noise.		Do not touch the rotating object. There is a possibility of fatal injure.
		(2) Check rotating direction of L.O Cooler (C-301, 302)	Confirm L.O. coolers rotate in the specified direction. (C-301, 302) (a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive L.O. Cooler.	Same direction as arrow put on motor No abnormal noise.		Do not touch the rotating object. There is a possibility of fatal injure.
		(3) Check Oil pressure of L.O. Pump	Confirm the oil pressure (PT-301) rises to the specified level:	0.1~0.5MPa		Do not touch the rotating object. There is a possibility of fatal injure.
		(4) Check oil leakage	Check leakage at all plugs, hoses, fittings and rotating shaft seals.	No leakage		Watch your standing place. Oil may change the floor slippy. Slippy floor could cause fatal injure.
		(5) Check G.B. L.O. Heater operation	Momentary operate G.B. L.O. HEATER (H-301) from Operation Terminal, and confirm no thermal trip.			
B8	Main Bearing Lubricant Oil Line	(1) Check rotating direction of L.O pump motor. (OP-306)	Confirm L.O. pumps rotate in the specified direction. (OP-306) (a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive Main Bearing L.O. pump motor.	clockwise as view from motor non drive end No abnormal noise from the pump.		Do not touch the rotating object. There is a possibility of fatal injure.

Commissioning Test Procedure (7/13)

iNo.	Tost Herr	Confirmation points	Procedure and section 201	Saya and Grand Crifteria	Remarks	a self of Safety
		(2) Check L.O pressure	Confirm pressure switch (PS-302) output is "ON".	"ON".	The output of PS-302 will be ON when the pressure exceeds 0.06MPa.	Watch your standing place. Oil may change the floor slippy. Slippy floor could cause fatal injure.
		.,	Check leakage at all plugs, hoses, fittings and rotating shaft seals.	No oil leakage		Watch your standing place. Oil may change the floor slippy. Slippy floor could cause fatal injure.
		(4) Check M.B. L.O. Heater operation	Momentary operate M.B. L.O. HEATER (H-303) from Operation Terminal, and confirm no thermal trip.			
В9	Cooling Water	Converter Cocling Pump Motor(OP-	Confirm Converter Cooling Pump motor rotate in the specified direction. (OP-401) (a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive Converter Cooling Pump motor.	same direction as arrow put on motor		Do not touch the rotating object, There is a possibility of fatal injure,
		Converter Water Cooler Fan (C-401)	Confirm Converter Water Cooler Fan retate in the specified direction. (C-401) (a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive Converter Cooling fan motor.	same direction as arrow put on motor		Do not touch the rotating object, There is a possibility of fatal injure,
		(3) Chack water leakege	Check leakage at all plugs, hoses, fittings and rotating shaft seals.	No leakage	1	Watch your standing place. Oil may change the floor slippy, Slippy floor could cause fatal injure.
			(a) Turn on the circuit breaker and contactor manually by handy operating terminal to drive Converter Cooling pump motor. (b) Confirm Water volume (FT-401) at Operation Terminal rises to the specified level:	100~120L/min		
		(5) Check Water Pressure	Confirm water pressure (PT-401) rises to the specified level:	0.23-0,4MPa.		

Commissioning Test Procedure (8/13)

			Commissioning Test 1 1000 de	(5, 15)	
No.	- Test Item	Confirmation points	Procedure and the second	Critoria	For Safety #1
B10	Generator	(1) Fill in the start up report	Fill in the start up report		
			Momentary operate each Generator Fan (M-5, M-6, M-7) from Operation Terminal, and confirm it rotate in the specified direction.	same direction as arrow put on motor	Do not touch the rotating object. There is a possibility of fatal injure.
		(3) Check heater's resistance of generator.	Measure the following heater resistance (a) DE heating resistance (b) NDE heating resistance (c) Slip ring heating resistance		Do not touch the wire on electricity.
	5		Operate the electro fan and measure the current and voltage in case of low speed and high speed. (a) Generator Inner Air Left Fan (M-5) (b) Generator Inner Air Right Fan (M-6) (c) Generator External Air Circuit Fan (M-7)		
		(5) Generator accessories	(a) Check non rotational elements cleared. (b) Check automatic lubricent system is suitable to be used and the dial is set. (c) Check number (quantity), states and contacting surface of brushes of slip-ring and drive end earth brush of generator.	(a) Cleared (b) Dial is set at *12* (c) Number, states surface	Do not touch the rotating object. There is a possibility of fatal injure.
B11	Step-up Transformer	Transformer Cooling FAN rotating direction	Momentary operate TRANSFORMER COOLING FAN (C-305) from Operation Terminal, and confirm it rotate in the specified direction.	same direction as arrow put on motor	Do not touch the rotating object. There is a possibility of fatal injure.
B12	Sensors	(1) Check wind speed by ultra sonic wind sensors.	Compare the difference between average wind speed of MX-108 and MX-109 (for one second).	5m/s or less	
			Compare the difference between average wind direction of MX-108 and MX-109 (for 10 min).	15degree or less	

Commissioning Test Procedure (9/13)

No.	Test Item	Confirmation points	Princedure es 2.5	Celteria collegione	Remarks	For Safety 4 a see a
	Yaw Control System	(1) Chack before Yawing	(a) Check cable twisting of power and communication cable between nacelle and tower. (b) Confirm grease to Yaw gear tooth. (c) Confirm Yaw brake oil leakage after manually ON/OFF operating of Yaw brake.	(a) No twisting (b) Enough or not (c) No leakage		Do not touch the rotating object. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
		(2) Adjust the yaw direction.	Rotate nacelle manually to the Main Wind Direction of site arrangement drawing. Confirm the nacelle direction in Operation Terminal indicates 0 degree (±12.1deg). If different, re-adjust zero position by rotating cam after removing the gear locking screw of Yaw potentiometer.	0 degree ±12.1deg		Do not touch the rotating object. There is apossibility of fatal injure.
		(3) Check the yawing.	(a) Turn on the circuit breaker and contactor manually and rotate yaw to make sure that the nacelle rotates to the right and left as viewed from top of the nacelle. Operate the yaw driving system by Operation Torminal. - To Right turn 30deg, push "Turn Right" button on Operation Terminal. - To Left turn 30deg, push "Turn Left" button on Operation Terminal. Check that there is no abnormal noise, twisting cable and interference during yawing between left and right turn.	Correct direction, no abnormal noise, twisting cable and interference during yawing		Do not touch the rotating object. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
i		(4) Functioning of Software Yaw Limit	(a) Temporarily set the "Software Yaw Limit" setting to "+5deg" of the current actual Yaw engle. (b) Manually rotate Yaw motor, and confirm further Yaw rotation by Yaw motor is inhibited when Yaw angle exceed the above temporary setting value. NOTE: When detecting Software Yaw Limit, this Test can be finished.		Witness Test Item	Do not touch the rotating object. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
B14	Blade Pitch Control System	(1) Pitch molion check	(a) Operate pitch blade to fine and feather direction, and check the blade pitch motion (fine and feather direction)	(a) Pitch motion: Visual Check & OT (-109 to -14 deg and return to -109 deg.)	10 minute wind speed shall be less than mainlenance speed and nacelle direction shall be 90 degree offset against wind direction.	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
		(2) Pitch memory	(a) Memorize the data of the pitch angle at the direction of -109 deg. (b) Memorize the data of the pitch angle at the direction of -14 deg.	(a) -109±1deg (b) -14±1deg		
		(3) Check the pitch operation.	Check the pitch operation during safety shut down excluding the effect of dumper zone. (a) Rotate nacelle direction to 90 degree from wind direction.(b) Move pitch angle to operating fine angle using Operation Terminal. Press emergency cush botton and Measure the time operation from fine to feather.	less than 20sec.		Do not touch the rotating object, Do not enter the rotating object while moving. Do not touch the electrified wire, There is a possibility of fatal injure and electrification.
		(4) Check the pitch operation in emergency condition	Check the pitch operation at emergency shut down mode. (a) Measure the time at maintenance PC during operation to fine position, (-109 to -14 deg.)	7 to 8 deg/sec during first 2 seconds, 5 to 6 deg/sec after first 2 seconds,		Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.

Commissioning Test Procedure (10/13)

No.	Tos Item	Confirmation points (1994)	Procedure 1	Criteria Con	Remarks	For Safety
B15			10 minute wind speed shall be less than maintenance speed and nacelle direction shall be 90 degree offset against wind direction. Rotor shall be locked by inserting lock-pins. (a) Scanning the sensors (b) Check the number of the sensors and measurement value (c) Store the configuration to the memory (d) Contirm the communication of the load measurement value by checking on touch parel.	Scaning is completed correctly.		
B16	Safety System Test	(1) Emergency Switch	Turn the blade pitch to the direction of -14deg, by manual operation prior to this check. (a) Push the emergency PB switch in Ground Cabinet, TOP cabinet, Gear Box, or Yaw Module. (b) Pitch brake is activated according to Safety Shutdown pitch rate. (c) After emergency switch trigger, Service brake is activated in 60 seconds or generator speed decreased down to service brake ready speed. (d) Measure the time during operation.	(d) less than 40 sec	Wirness ⊺est llem	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
		(2) Hardware Yaw Limit	(a) Forcibly set the Yaw Limit switch input. (b) Safety relay activate and WTG automatically shutdown,	Safety Relay (KS2) activate	Wilness Test Item	
			(a) Foroibly activate Nacelle shock sensor input, by manually flip the shock sensor. (b) Confirm activation of safety relay.	Safety Relay (KS2) activate	Witness Test Item	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
		(4) Functioning of Control System	Disconnect fiber optic cable between TOP cabinet and HUB cabinet, Confirm activation of safety relay,	Safety Relay (KS2) activate	Witness Test Item	
B17	Surge absorbers	Check Surge Absorbers.	Check that LED of the surge absorbers is green.	LED (green) on		
B18	interference of rotating parts	Check the interference of rotating parts	(a) Make sure that the locking pins (low speed, high speed) and service brake is released. (b) Make sure that there is not interference part of rotating shaft around Brakes - Speed sensors	No contact	feathering position -Under the strong wind, manually yaw the nacelle to 90 degree against the	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire, There is a possibility of fatal injure and electrification.
B19	Lighting	Check the tower light.	Confirm whether all lights are turned on normally.	All lights turn on		Do not touch the electrified wire. There is a possibility of fatal injure and electrification.

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Commissioning Test Procedure (11/13)

No.	Test Hern	Confirmation points	E. g. Procedure	Criteria	Remarks	For Safety
Step	C. After Grid	Electric Power Receiving:				
C1	Phase, voltage & frequency check	(1) Measurement of incoming vollage	(a) Check all breaker in the control cabinet is disconnected. (b) In Top Converter Cabinet, connect Q2 breaker. (c) And measure the voltage between the phases at the following terminals of downstream side of F62. Confirm the incoming voltage is 690Vac±10%. - R-S: F62, between terminals 2 & 4 - S-T: F62, between terminals 3 & 5 - S-T: F62, between terminals 6 & 2 (d) Measure the voltage between the terminals 2, 3, 4 (R, S, T) of downstream side of F62 and ground. And confirm the voltage is 398V±10 %. - between terminals 2 of F62 and earth bar - between terminals 3 of F62 and earth bar - between terminals 4 of F62 and earth bar (e) At the same time, read the CCU detected voltage value using Operation Terminal (OT) and record.	(c) - R.S.: 690±69Vac - S-T.: 690±69Vac - T-R: 690±69Vac (d) - R. earth bar: 398±39,8Vac - S earth bar: 398±39,8Vac - T- earth bar: 398±39,8Vac		Do not touch the electrified wire. There is a possibility of fatal Injure and electrification.
		(2) Measurement of incoming frequency.	(a) Measure the frequency at the terminals 2, 3, 4 (R, S, T) of downstream side of F62, and check the incoming frequency is within 60±1Hz. (b) At the same time, read the CCU detected voltage value using Operation Terminal (OT) and record.	60±1Hz	If the frequecy is in following range, this lest can be carried out by the customer's acceptance. Range; 61 to 63Hz or 59 to 57Hz	Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
C2	Safety System Test	(1) Activation Speed (HSS)	(a) Temporarily setup Overspeed Detector setting from 1346.3rpm (117% of rated speed) to 600:pm. (b) Startup burbine When rotational speed reaches to the activation speed, the pitch brake is activated and shutdown turbine.	HSS spead when activating Safety shutdown - At 600rpm (at HISS) [7.8rpm at LSS] Turbine Trip The following alarm shall be displayed on the Handy Operational Terminal -SS2401 HSS Over Speed	Witness Test Item Note; Setting value must be restored after testing.	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire, There is a possibility of fatal injure and electrification.
		(2) Activation Speed (LSS)	(a) Temporarily setup Overspeed Detector setting from 17.55rpm (117% of rated speed) to 6.5rpm. (b) Startup turbine When rotational speed reaches to the activation speed, the pitch brake is activated and shutdown turbine.	LSS speed when activating Safety shutdown - At 6.6rpm (at LSS) [506.3rpm at HSS] Turbine Trip The following alarm shall be displayed on the Handy Operational Terminal SS2401 HSS Over Speed	Witness Test Item Note; Setting value must be restored after testing.	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
i		(3) Q8 Breaker	(a) Forcibly activate the "SS1 from PLC" signal. (b) Confirm disconnection of generator from the gird, and at the same time of pitch braking.	-Confirm Fault Message of Operation Terminal - \$25217: \$51 from PLC \$52000: Stator Circuit Braker Trip	Witness Test Item	Do not touch the electrified wire, There is a possibility of fatal injure and electrification.
C3	FSI Unit Calibration	Calibration of FSI unit for AIPC system (for MWT95)	(a) Rotate the rotor by turning motor and stop the rotor when blade position is at vertical position. (b) Auto-calibrate the load value by measuring the azimuth angle and load date measured by FSI unit	Calibrated correctly		

Commissioning Test Procedure (12/13)

No,	Tea Item	Continua	tion points	Proveding .	Criteria	Remarks	For Safety
C4	Check before synchronization	(1) Safety synchronization		re(a) Confirm circuit breakers are in "ON" position. (b) Make sure Service Brake Switches and Emergency Push Buttons are "CFF" position. (c) Make sure the following parts of the wind turbine does not make abnormal noise, wibration and oil leakage while the rotor is up to running speed, and during operation. -Blades and hub -Searbox -Generator -Hydraulic unit -Yaw drive gear box and motors -Control nanek		ground before the generator	Evacuate from the Wind Turchne before synchronization. There is a possibility of fatal injure and electrification.
		(2) Check auto synchronization.	start-up prior	to- Monitor the generator rotating speed and blade pitch angle. Make sure that the blade pitch angle moves from -109 to the set degree for starting up automatically. The rotating speed of the rotor will be increasing.		,	Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.

Commissioning Test Procedure (13/13)

No. selest tem	Goniir mailon pointa	Procedure #55	Caleta	Remarks 4	For Safety
Step D. After synd	hronization				
D1 Check required to conclude the commissioning	(1) Oil leakage after trial test	After the turbine has run for the period of 2~3 minutes, recheck for any oil leakage of the hydraulic system pipe joints, gearbox lubrication pipe joints & tank filters and generator. Also make sure there are no noises or vibration at the nacelle, the generator and so on during the above turbine operation.			Do not touch the rotating object. Do not enter the rotating object while moving. Do not touch the electrified wire. There is a possibility of fatal injure and electrification.
	(3) Confirmation of Check Sheet	Check the following data on handy operating terminal: (a) Wind Speed (b) Generator Output (c) Wind Dir. Difference (d) Alternating Voltage (e) Network Voltage (e) Network Voltage (f) Frequency (g) Power Factor (h) Generator Winding Temperature (i) Generator Bearing (DE) Temperature (i) Generator Bearing (NDE) Temperature (i) Generator Bearing (NDE) Temperature (i) Generator Silp-ring cover Temperature (m) Main bearing Lubricant Oil Temperature (n) Main bearing Temperature (n) Main bearing Temperature (o) Gearbox Lubricant Oil Temperature (o) Gearbox Lubricant Oil Temperature (o) Gearbox Lubricant Oil Temperature (g) Converter cooling water Temperature (g) Converter cooling water Temperature (j) Inside Converter/Dewer cabinet Temperature (j) Inside Converter/Dewer cabinet Temperature (j) Inside Naccella Temperature (j) Inside Naccella Temperature (j) Inside Naccella Temperature (j) Insignated Total Internal Power Consumption (w) Integrated Total Internal Power Consumption (w) Integrated Total Internal Power Consumption (w) Integrated Total Internal Power Consumption (w) Integrated Total Internal Power Consumption (w) Integrated Total Running Hours - Press "STOP" button on handy operating terminal, Make sure that the generator is disconnected and wind turbine stops. (Blades are in the feather position.) When all systems have checked out as acceptable, commissioning phase concludes.			

6. COMMISSIONING CHECK SHEET

A copy of the commissioning check sheet in the following pages shall be sent to:

- Operator/Maintenance Manual
- Manufacturer
- Developer
- Independent Engineer

CC	OMMISSIONING CHEC	CK SHEET FOR MW	92(95)/2.4	
• MANUFACTURER	: MITSUBISHI HEAVY INDUSTRIES, LTD. NAGASAKI SHIPYARD & MACHINERY WORKS 180 Koyagi-cho, Nagasaki, Japan			
• OPERATOR	: NAME			
• DATE	: Energization:	Commissioning	Completion:	
• LOCATION OF WTG	:	_		
• NACELLE SERIAL NO.	: Front Module:	, Rear M	fodule:	
	Yaw Module:			
• HUB SERIAL NO.	:			
BLADES SERIAL NO.			No.3:	
• GEAR BOX SER. NO.	:			
• GENERATOR SER. NO. • TOWER SERIAL NO.	· Linnar	 Middle:	Lower:	
• CABINET SER, NO.	: Tower:			
	- AGWGA			
• WIND SENSOR SER. NO.	: MX-108:	MX-109:		
_				
_				
-				
SS				

CHECK SHEET FOR MECHANICAL PERSONNEL

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
A.	Before the electric power receiving	Linguistant comments and	Action of the second	
A1	Visual Inspection of Installation			
(1)	Check the tightening of structural bolts		M*-86.00-100	
	(a) Blade connecting bolts	Tight	OK • NO good	
	(b) Hub connecting bolts	Tight	OK • NO good	
	(c) Tower-Yaw module connecting bolts	Tight	OK • NO good	
	(d) Tower middle flange bolts	Tight	OK • NO good	
	(e) Tower internal ladder installation	Tight	OK • NO good	
	(f) Bolts for Ground Cabinet	Tight	OK • NO good	
(2)	Visual inspection of damage			
•	(a) Blades	No damage	OK • NO good	
	(b) HUB	No damage	OK • NO good	
	(c) Nacelle(Front Module, Rear Module)	No damage	OK • NO good	
	(d) Tower	No damage	OK • NO good	
	(e) Ground Cabinet, enclosure, doors	No damage	OK • NO good	
	(f) Safety features, Tower nacelle and Hub (g) Electrical cables and hydraulic hoses	No damage	OK • NO good	
		No damage	OK • NO good	
	(h) Opening & closing of Nacelle hatch. (i) Other part ()	No damage No damage	OK • NO good OK • NO good	
A2	Oil level	140 damage	OK - NO good	
 ^ _		To be center of side	OK • NO cood	Not Added /
•	(a) Gearbox oil level	gauge	OK • NO good	Added
	(b) Yaw gear box oil level	To be between two	OK • NO good	Not Added /
		lines referred to	011 110 8000	Added
		commissioning test		Tuded
İ		procedure		
	(c) G.O. hydraulic unit tank oil level	To be between	OK • NO good	Not Added/
		"High Oil Level at	Ü	Added
		Depressurized ACC" &		
		60mm under this line		
	(d) L.O. for Main bearing unit tank oil level	To be between	OK • NO good	Not Added /
		"Max Oil Level and		Added
		operational oil level		
A3	ACC N2 GAS Pressure			
	Check the gas pressure in accumulator [ACC-101]	13~14MPa	OK • NO good	Not Charged /
	[45 40 m	(MPa)	Charged
	[ACC-102]	17~18MPa	OK • NO good	Not Charged /
	[ACC 2113	10 11340	(<u>MPa</u>)	Charged
ł	[ACC-211]	10~11MPa	OK • NO good	Not Charged /
	[ACC-221]	10~11MPa	(<u>MPa</u>) OK • NO good	Charged Not Charged /
	[ACC-221]	10~11Wira	(MPa)	Charged /
	[ACC-231]	10~11MPa	OK • NO good	Not Charged /
	[160 231]	10 11111111	(MPa)	Charged
A4	Cable termination & connection	-	/	
(1)	Check cable bolt condition.			Visit bereitettet in Arrait en freite de Affreitettet in Attistische des
ľ	(a) Grounding cable bolts	Tight	OK • NO good	
	(b) 690V/230V cable bolts	Tight	OK • NO good	
	(c) High Voltage cable bolts	Tight	OK • NO good	
(2)	Check cable termination & connector looseness	Tight	OK • NO good	
(3)	Check damage of electrical components	No damage	OK • NO good	
(4)	Wiring check	Accordance with the	OK • NO good	
		electrical drawing.		
A5	Instrument Setting			
(1)	Adjust the instrument settings	In accordance with	OK • NO good	
(2)	Check Top PLC and Hub PLC.	Instrument Setting List	OK • NO good	

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
A6	Insulation test of Auxiliary motor and equipr	nent		
	Measurement of insulation resistance.	500V Megger		
	(a) Generator terminal - ground	5Mohm or more	OK • NO good	
	(b) Step up transformer terminal - ground	5Mohm or more	OK • NO good	
	(c) No.1 YAW Motor - ground	5Mohm or more	OK • NO good	
	(d) No.2 YAW Motor - ground	5Mohm or more	OK • NO good	
	(e) No.3 YAW Motor - ground	5Mohm or more	OK • NO good	
	(f) No.4 YAW Motor - ground	5Mohm or more	OK • NO good	
	(g) G.O. Pump Motor - ground	5Mohm or more	OK • NO good	
	(h) G.O. Cooler Motor - ground	5Mohm or more	OK • NO good	
	(i) Main Bearing L.O. Pump Motor - ground	5Mohm or more	OK • NO good	
	(j) Main Bearing L.O. Cooler/Gear Box L.O Cooler A Motor - ground	5Mohm or more	OK • NO good	
	(k) Gear Box L.O Pump A Motor - ground	5Mohm or more	OK • NO good	
	(I) Gear Box L.O Pump B Motor - ground	5Mohm or more	OK • NO good	
	(m) Gear Box L.O Cooler B Motor - ground	5Mohm or more	OK • NO good	
	(n) Transformer Cooler Fan Motor - ground	5Mohm or more	OK • NO good	
	(o) Converter Cooling Water Cooler Fan Motor - ground	5Mohm or more	OK • NO good	
	(p) Converter Cooling Pump Motor - ground	5Mohm or more	OK • NO good	
	(q) Generator Inner Cooling Fan A Motor - ground	5Mohm or more	OK • NO good	
	(r) Generator Inner Cooling Fan B Motor - ground	5Mohm or more	OK • NO good	
	(s) Generator Outer Cooling Fan Motor - ground	5Mohm or more	OK • NO good	
	(t) Gear Box L.O. Heater A, B, C, D, E - ground	5Mohm or more	OK • NO good	
	(u) Main Bearing L.O. Heater – ground	5Mohm or more	OK • NO good	

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
В	After temporary electric power receiving			4
B1	Phase, voltage & frequency check			
(1)	Measurement of incoming voltage.		OK • NO good	
	- R-S:	690±69Vac	(V)	
İ	- S-T:	690±69Vac	(V)	
l	- T-R:	690±69Vac	(V)	
}	- R- earth bar:	398±39.8Vac	(V)	
•	- S- earth bar:	398±39.8Vac	(V)	
<u>.</u>	- T- earth bar:	398±39.8Vac	(V)	
(2)	Measurement of incoming frequency		OK • NO good	
		60±5Hz	(Hz)	
(3	Measurement of power supply voltage		OK • NO good	
	(a) UPS output (Ground)	230±23Vac	(V)	
	(b) G1/G2/G3 (Top Control)	24.0+0/0.5Vdc	(v)	
	(c) G1/G2/G4 (Hub)	24.0+0/0.5Vdc	(V)	
	(d) G1 (Ground)	24.0+0/0.5Vdc	(V)	
	(e) UPS cabinet	120Vdc±12V	(V)	
B2	Visual Inspection of Installation			
(1)	Inspect corrosion, weld spot and paint damage	Visual	OK • NO good	Dwg.No
	. Parts and point (<u>Hub bolts</u>)	No damage		()
		Visual	OK • NO good	Dwg.No
ŀ	Parts and point (<u>Tower bolts</u>)	No damage		()
ŀ		Visual	OK • NO good	Dwg.No
	Other point ()	No damage		()
B3	Control Cabinet			
(1)	Confirmation of PLC and CCU start-up			
i	(a) CCU's LED	"88"	OK • NO good	
	(b) Top PLC's LED	"8"	OK • NO good	
	(c) Hub PLC's LED	"8"	OK • NO good	
(2)	Check and adjust setting of PLC			
	Input data.			
	(a) Communication (IP address)	As per customer'	OK • NO good	
	(b) Calendar (Date, Time)	Local current date	OK • NO good	
	(c) Columnar wind	As per customer'	OK • NO good	:
	(d) Memory clear	Memory is cleared	OK • NO good	

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
B4	Ground Cabinet			
(1)	Communication check of operation terminal	Check display data	OK • NO good	HERPHILIPANIE POR PROPERTY AND ADMINISTRATION OF THE PROPERTY ADMINISTRATION OF THE PROPERTY AND ADMINISTRATION OF THE PROPERTY AND ADMINISTRATION OF THE PROPERTY AND ADMINISTRATION OF THE PR
(2)	Communication check of Maintenance Tool	Check display data	OK • NO good	
B5	Check leakage			
	(a) Gearbox	No leakage	OK • NO good	
	(b) Gear coupling	No leakage	OK • NO good	
	(c) Main bearing	No leakage	OK • NO good	
	(d) Oil piping joints	No leakage	OK • NO good	
	(e) Rotor hub internal and Rotary Joint	No leakage	OK • NO good	
	(f) Oil Cooler	No leakage	OK • NO good	
	(g) Off Line Filter	No leakage	OK • NO good	
	(h) Water Coolers	No leakage	OK • NO good	
	(i) Other point ()	No leakage	OK • NO good	
36	Governing Oil Line			
(1)	Rotating direction of G.O Pump Motor	Same direction as	OK • NO good	
	(OP-101)	arrow put on motor		
		No abnormal noise	OK • NO good	
(2)	Rotating direction of G.O Cooling Pump	Same direction as	OK • NO good	
	(C-101)	arrow put on motor		
		No abnormal noise	OK • NO good	
(3)	Oil pressure of G.O. Pump	More than	OK • NO good	
		27.0±0.5MPa	(<u>MPa</u>)	
(4)	Oil Leakage	No leakage	OK • NO good	-,-,-
(5)	Rod length of Boosters Adjustment			
	- Service Brake Booster	At Brake on:	OK • NO good	Air-bleeder
	If rod length is out of required range, adjust the booster length.	200±5mm	(mm)	
	- Yaw Brake Booster	At Brake on:	OK • NO good	
	If rod length is out of required range, adjust the	150±5mm	(mm)	
6)	booster length. Service Brake			
U	(a) Activate check	(a) Stop Rotor	OK • NO good	
	(b) Release check	(b) Gap; from 2.5-	OK • NO good	
	(0)	0.85mm to		
		2.5+1.10mm		
37	Gear Box Lubricant Oil line			
(1)	Rotating direction of L.O Pump Motor (OP-303, 305)	Same direction as	OK • NO good	
,		arrow put on motor		
		No abnormal noise	OK • NO good	
(2)	Rotating direction of L.O Cooler (C-301, 302)	Same direction as	OK • NO good	
	- , ,	arrow put on motor		
		No abnormal noise	OK • NO good	
(3)	Oil pressure of L.O. Pump	0.1~0.5MPa	OK • NO good (MPa)	
(4)	Oil Leakage	No leakage		
		110 leakage		
(4) (5)	Oil Leakage G.B. L.O. Heater operation	No leakage	OK • NO good OK • NO good	

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
	Main Bearing Lubricant Oil Line			
(1)	Rotating direction of L.O pump motor. (OP-306)	Clockwise (view	OK • NO good	
		from motor non	077 370 1	
		drive end)	OK • NO good	
(2)	Oil pressure of L.O. Pump (PS-302)	No abnormal noise ON.	OK • NO good	
(2)	Pressure of L.O. Fump (F3-302)	ON.	(MPa)	
(3)	Oil Leakage	No leakage	OK • NO good	
(5)	M.B. L.O. Heater operation		OK • NO good	THE THE PERSON CONTRACTOR OF THE PERSON OF T
B9	Converter Cooling Water line		The grad	
(1)	Converter Cooling Pump (OP-401)	Same direction as	OK • NO good	
	, , ,	arrow put on motor		
		No abnormal noise	OK • NO good	
(2)	Rotating direction of Converter Water Cooler Fan	Same direction as	OK • NO good	
	(C-401)	arrow put on motor		
		No abnormal noise	OK • NO good	
(3)	Water leakage	No leakage	OK • NO good	
(4)	Water flow and volume (FT-401)	100~120L/min	OK • NO good	
			(L/min)	
(5)	Water Pressure (PT-401)	0.23 – 0.4MPa	OK • NO good	
			(L/min)	
	Generator		AT 1:0 1	
(1)	Start up report	Fill in	OK • NO good	
(2)	Electro fan's rotational direction of generator. (a) Generator Inner Air Left Fan (M-5)	Clockwise seen	OV • NO good	
	(a) Generator filler Air Left Fair (ivi-5)	from the top	OK • NO good	
	(b) Generator Inner Air Right Fan (M-6)	Un-clockwise seen	OK • NO good	
	i	from the top	OK TO good	
	(c) Generator External Air Circuit Fan(M-7)	Clockwise	OK • NO good	
(3)	Heater's resistance of generator.	No. of the second secon		
	(a) Generator Inner Air Left Fan (M-5)	()A/ ()V	OK • NO good	The second secon
	(b) Generator Inner Air Right Fan (M-6)	()A/	OK • NO good	71-71-07-11-11-11-11-11-11-11-11-11-11-11-11-11
	(1) Constain Miles I in Taght I an (1) O	()V	OK NO good	
	(c) Generator External Air Circuit Fan(M-7)	()A/	OK • NO good	k I I I Statistick of the I make make a fee on confee
		()V		
4)	Check electro fan's consumption of generator.			**************************************
	(a) Generator Inner Air Left Fan (M-5)	Low speed	OK • NO good	
		()A/		
		()V		
		High speed		
		()A/		
	(b) Generator Inner Air Right Fan (M-6)	()V	OK • NO good	
	(b) Generator filler Air Right Fan (M-0)	Low speed ()A/	OK • NO good	
)V		
		High speed		
		()A/		
		()V		
	(c) Generator External Air Circuit Fan(M-7)	Low speed	OK • NO good	
		()A/		
		()V		
		High speed ()A/		

(5) Generator accessories			
(a) Non rotational elements cleared.	Cleared	OK • NO good	
(b) Automatic lubricant system is suitable to be used	Dial is set at 12.	OK • NO good	
and dial is set.			
(c) number (quantity), states (condition) and	Number	OK • NO good	
contacting surface of brushes of slipring and drive	States		
end earth brush of generator.	Surfaces		İ

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
311	Step-up Transformer			
	Transformer Cooling FAN rotating direction	Same direction as arrow put on motor	OK • NO good	
312	Sensors	arrow put on motor		. .
	Difference between average wind speeds	5m/s or less	OK • NO good	
	of MX-108 and MX-109	3111/3 OF 1033	OR NO good	
(2)	Difference between average wind direction of MX-108 and MX-109	15degree or less	OK • NO good	
313	Yaw Control System			
	Check before Yawing	(a) No twisting	OK • NO good	
,	(a) Check cable twisting	(b) Enough or not		
	(b) Grease to Yaw gear tooth.	(c) No leakage		
	(c) Yaw brake oil leakage			
	Adjust the yaw direction.			
	Adjust the yaw direction to be 0deg against the		OK • NO good	Match mark
	dominant wind direction.	0±12.1deg	(deg)	
(2)	Chook verving			
(3)	Check yawing. (a) Commanded direction of rotation by Handy	Correct direction	OK • NO good	
	Operational Terminal.	Confect direction	OK - NO good	
	(b) Abnormal Noise	No abnormal noise	OK • NO good	
	(c) Cable twist interference	No twist cables nor	OK • NO good OK • NO good	
	() Sacro (wist interterence	interference during	OR THO good	
		yawing		
(4)	Functioning of Software Yaw Limit	Janue	OK • NO good	
	Blade Pitch Control System			
(1)	Pitch motion check		077 370 1	
	Check Blade pitch motion	Visual Check	OK • NO good	
	(-109 to -14 deg and return to -109 deg.)	& Handy Operation	OK • NO good	
(2)	Dial	Terminal Display	OK NO 1	
	Pitch memory	1001 111	OK • NO good	
	(a) Feather Position	-109deg±1deg	(deg)	
	(h) Eine Desition	141	(mA)	
	(b) Fine Position	-14deg±1deg	(deg)	
(3)	Check the pitch operation exclude the dumper effect		(mA)	
رد	zone.	į į	OK • NO ~~~	
	To feather (-14 to -104)	less than 20sec.	OK • NO good (sec)	
(4)	Check the pitch operation in emergency condition	~2 second	(SEC)	
נדי	check the phon operation in emergency condition	1 1	OK • NO good	
		7-8 deg/sec	OK - NO good	
		2 second~		
R15	FSI Unit Calibration	5-6 deg/sec		
		The many transfer	OY - NO '	
(1)	(a) Scanning the sensors (b) Check the number of the sensors and	The number of	OK • NO good	
	measurement	sensor is 18.		
		i i		
	value	Communication	OK • NO ~~~	
	value (c) Store the configuration to the memory	Communication is	OK • NO good	
	value (c) Store the configuration to the memory (d) Confirm the communication of the	Communication is not abnormal	OK • NO good	
	value (c) Store the configuration to the memory (d) Confirm the communication of the Load measurement value by checking on touch	1 1	OK • NO good	, , , , , , , , , , , , , , , , , , , ,
216	value (c) Store the configuration to the memory (d) Confirm the communication of the Load measurement value by checking on touch panel.	not abnormal		
	value (c) Store the configuration to the memory (d) Confirm the communication of the Load measurement value by checking on touch	1 1	OK • NO good	

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	- Brakes - Speed Sensors -	No contact No contact	OK • NO good OK • NO good	
B18	Lighting			
	Check tower light	All lights turn on	OK • NO good	

No.	CHECK LIST	REQUIREMENT	RESULT	REMARKS
	After the electric grid power receiving	Area and Area and Area	a distribution de la companya de la companya de la companya de la companya de la companya de la companya de la	
C1	Phase, voltage & frequency check			
(1)	Measurement of incoming voltage.		OK • NO good	
	- R-S:	690±69Vac	(V)	
	- S-T:	690±69Vac	(V)	
	- T-R:	690±69Vac	(<u>V</u>)	
	- R- earth bar:	398±39.8Vac	(V)	
	- S- earth bar:	398±39.8Vac	(V)	
	- T- earth bar:	398±39.8Vac	(V)	
(2)	Measurement of incoming frequency.	60±1Hz	OK • NO good	
			(Hz)	
C2	Safety System Test			
	(1) Activation Speed (HSS)	Trip / SS2401	OK • NO good	
		SS2508		
		SS2516		
	(2) Activation Speed (LSS)	Trip / SS2400	OK • NO good	
	(===)	SS2508		
		SS2516		
	(3) Q8 Breaker	Trip / SS2000	OK • NO good	
		SS2002		
		SS2508		
		SS2516		
-		SS2517	077 370	
C3	FSI Unit Calibration	Calibrated correctly	OK • NO good	
C4	Check before synchronization			
(1)	Safety check before synchronization	No abnormal noise	OK • NO good	
	(a) Unusual noise and vibration while	and vibration		
	accelerating and generating			
	(Part:			
	(b) No oil leakage of hydraulic system under	No leakage	OK • NO good	
	pressure			
	(<u>Part:</u>)			
(2)	Check auto start-up prior to synchronization.	Auto start-up	OK • NO good	
12/	Check date start up prior to synoniomzation.	1 xuio siari-up	OAL THO good	

No. CHECK LIST	REQUIREMENT	RESULT	REMARKS
D. After synchronization	and the state of	Apple to	4.0
(1) Oil leakage after trial test (a) Unusual noise and vibration after functional movements of all parts (Part:) (b) No oil leakage of hydraulic system after pres	No unusual noise, vibration	OK • NO good	
(2) Check the data.		OK • NO good	
(a) Wind Speed (b) Generator Output (c) Wind Dir. Difference (d) Alternating Voltage (e) Network Voltage (f) Frequency (g) Power Factor (h) Generator Winding Temperature (i) Generator Bearing (DE) Temperature (j) Generator Bearing (NDE) Temperature (k)Generator Slip-ring cover Temperature (l) Governing Oil Temperature (m) Main bearing Lubricant Oil Temperature (n) Main bearing Temperature (o)Gearbox Lubricant Oil Temperature (o)Gearbox Lubricant Oil Temperature (p)Gearbox High Speed Bearing Temperature (q)Converter cooling water Temperature (r)Inside Converter/Power cabinet Temperature (s)Ambient Temperature (t) Inside Nacelle Temperature (u) Integrated Total Output of Generator (v) Integrated Total Running Hours	1	(m/s) (kW) (deg) (V) (V) (Hz) (degC)	

_				
•	After mechanical completion the WTG has be	en su	ccessfully commissioned as defined by drawin	g N30-10H-
	0139 has achieved commercial operation and	is read	ly for unattended operation. All minor deficien	ncies have
l	been reported on a punch list.			
	Place / Date	:		
	Manufacturer	:		
	Operator	:		
L				

The following persons verify that the record of commissioning checks has been completed satisfactory, with the exception of the items detailed on the Punch List.

VERIFYING PERSONS

The following person attended and verified the commissioning was completed as detailed on the check sheets:

FOR THE MANUFACTURER	:	NAME
FOR THE DEVELOPPER	:	NAME
INDEPENDENT ENGINEER (if necessary)	:	NAME
		ADDRESS"

(Attachment for A5 Instrument Setting)

Instrument Setting List

Fauinment	Description	1				So	ttina				
Timer	2000 I ptioti	Dial:	1	Х		TRAEL		MO	DE:		
(a1) KS2T	On Delay Timer	10sec				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		.v.C			
(a2) KT1:	Off Delay Timer	60sec).1 min		10			D A		200
(a3) KR330		10sec		1 sec		10			D D	4.0	
(a4) K50 :	Timer One shot	10sec		1 sec		10			J A		
(a5) K108	Off Delay Timer	10sec		1 sec		10		į	D .		
Thermostat		1	Dial	;						A TOTAL	7.50
(b1) BT1			0 (deg	C)	les i	2 1460				Sec. 1	
(b2) BT3:		1	15 (de			4			-		
(b3) BT4:			15 (de		40	gi ini	4	out out			
(b4) BT5:			15 (deg	jC)		- 10 - - 1 1	No all and	or Charles		-2	4 100
(b5) BT6:			15 (deg								
(b6) BT1:		<u> </u>	0 (deg				11.7		200	3 0 10	
(b7) BT2 :		 	5 (deg						a a see alka	Section 2	
Space Heater	· · · · · ·		Dial		1 1100	7.7		and the second	(54)	117	
(c1) R1:		<u> </u>	5 (deg					2000	7.7.6	11.6	
(c2) R2 :	MARKS AND A	 	5 (deg			e Con Complete Com			altaria (4)	200	
(c3) R3:		1	5 (deg			T 10					
(c4) R1 :		 	5 (deg								
Hygrostat		<u> </u>	Dial		1 10						48.00.0
(d) HT1:			85 (%	5)		41 - 45%	rtop i d	unitaria (191			644
Thermal Relay											
	DP-101 (G.O. Pump)		25A			Access 1		100		100	
	DP-102 (G.O. Cooler)		2.04		18 W	74.00	4 1/4, 5	Associate	waran	er e gran	dyd ac
	OP-306 (Main Bearing L.O. Pump)		2.04						100		
	C-301 (Main Bearing L.O. Cooler/Gear Box	1	4.0A	١							
L.O Cooler	A) DP-305 (Gear Box L.O Pump A)	 	7 0 4						1.00		
	DP-306 (Gear Box L.O Pump B)	 	7.8A 7.8A		- 1				100		
	C-302 (Gear Box L.O Cooler B)	 	4.04			July 16					
	C-305 (Transformer Cooler Fan)	 	1.44		-		1 2 2		e e		
	C-401 (Converter Cooling Water Cooler Fan)		3.2A		-		4.		50,5050.00	and the	9.00
	OP-401 (Converter Cooling Pump)		1.94								
	: M1 (No.1 YAW)	1	4.3A	١		1 458					
	: M2 (No.2 YAW)		4.34								
	: M3 (No.3 YAW)		4.34		J. F.			e company			
	: M4 (No.4 YAW)		4.3A 18A			er er e	***	i plumijast	CONTRACTOR		
	: YAW total							100			
	A: M5 (Generator Inner Cooling Fan A	ļ	2.45A								
Lower)	2B : M5 (Generator Inner Cooling Fan A		9.5A		-						
Higher)	.b. No (Generator Illier Cooling FarrA	i	9.JF	•							
	BA : M6 (Generator Inner Cooling Fan B	1	2.45/	4		41. 144.14					
Lower)	(•							
	BB: M6 (Generator Inner Cooling Fan B	1	9.5₽		1777		100	1700			er er
Higher)									100		
(e17.1) Q14	A: M7 (Generator Outer Cooling Fan Lower)	<u> </u>	2.45/						or and the second	100	19.07
(e17.2) Q14	B : M7 (Generator Outer Cooling Fan		9.5A			100			or the Court		
Higher)	(Conceptor Conception)		10A		_						
	(Generator Space Heater) H-301/H-302 (Gearbox L.O. Heater)	1	9.5A		1000						
	H-303 (Main bearing L.O. Heater)	i	1.3A								
GROUND FAULT I		 	1.0/		22.7						
(f) GFR:	N==-7.11		00mA/	loos	-						e de de
——————————————————————————————————————	0.5	 	JOUITIA	1366		D:- 4	Ossaid - I-				
Over Speed Detect	וט	D1	D2	D3	D4	Dip S	Switch	D7	D8	D9	D10
(64) 1140/75	201) : for 1 00						D6		i -	-	
	DG1): for LSS	0	1	1 0	1 1	1	0	1	0	0	0
	DG2): Over Speed Detector for HSS DG3): Over Speed Detector for HSS	0	<u>0</u>	0	1 1	1	1	1	1	0	1
Circuit Breaker	500). Over opeed Detector for Floo	L=	T1=	T2=	T4=					U	
	V - 100EP					13=	S=	G=	N=		
(h1) Q8 :	and Daniel and	0.91	6s	0.3s	1s	5.6	1_	0.2	O- 500'		
	rcuit Breaker rcuit Breaker	0.68	3s	0.25s	 -	1.5	<u> </u>	 -	On 50%		7.60
	rcuit Breaker rcuit Breaker	0.72	3s 3s	0.25s 0.25s	-	6.5 5.5	- -	ļ <u> </u>	Off 50% Off 50%		
1,117,00.0	rount proditor	0.0	ూ	0.203		0.0	L	<u> </u>	UII 3070	2500.00	POP METERS AND

MWT92/2.4 60Hz

Instrument Setting List

(1) HUB CABINET

		Equipment Description		Setting								
Tir	mer	··· ·	Dial:	Х	TRAED	MODE:	1	$\overline{}$				
	K108	Off Delay Timer	30sec	0.1 min	5	D	12.1	3024				
	KT1	Off Delay Timer	2sec	1 sec	2	D	15-21 LO WELL	3021				
	KT2	Off Delay Timer	2sec	1 sec	2	D		3021				
	КТ3	Off Delay Timer	2sec	1sec	2	D		3021				
Th	ermostat			Dial:	100000000000000000000000000000000000000	dati e la K						
	BT1	For heater (R1/R2)	5 (degC)		OME TABLE	A SHEET SHEET	3000				
	BT2	For fan (V10)		(degC)								
	втз	Cabinet temperature low detection (trigger for K108 off-delay timer)	0 (degC)				3024				

	Equipment Description)					Se	etting					Shee
CPU Card			F	P.F.R./(OLD							. [22]	
-U10	BH2111 CPU Card	Front panel		COL	D								3002
Analog Card			AlO	Al1	Al2	Al3	Al4	AI5	Al6	A17		18 July	$\overline{}$
-U13	BH2353 8Analog Input	Front panel	mA	mA	mA	mA	mΑ	mA	mA	V		46.733	3009
-U14	BH2353 8Analog Input	Front panel	mA	mA	mA	mA	mA	mA	mA	mΑ		(3010
SSI + 4Ana	log Card	•	jum	per/no	jumpe	r			1			5.5	
-U15	BH2413 / Jumper S7	board		jump	er						100		3011 3012
Communicat	ion			M1/N	Λ2		Н	D/FD		jumpe	er/not j	umper	
	BH2501 port1	Front panel	Λ	12 (RS	485)		FD (F	ull Dup	lex)				3002
-U16	Brizadi politi	board /Jumper S9								j	umpe	r	
[-0.10	BH2501 port2	Front panel	М	1 (RS	232C)		FD(de	on't ca	re)		1.		
	DELEGOT PORTZ	board /Jumper S10			illing (100)				111			't care)	Ī

MWT92/2.4 60Hz

Instrument Setting List

(2) TOP CONTROL CABINET (a) Cabinet Equipments

	Equipment Description	Setting									
imer		Dial:	1	Х	T	TRAEL	7	MODE	:		一
KS2T	On Delay Timer	10sec									
KT1	Off Delay Timer	60sec	O.	.1 min	, T	10		D			
KR330A	Off Delay Timer	30sec	O.	.1 min	,	5	···†	D	200	nitikitis	
K50	Timer One shot	30sec	Ö.	.1 min	,	5	****	j		000000	
hermostat			Dial:								
BT1	Cabinet temperature low detection		(deg	C)	3			100			
PI I	(trigger for KR330A off-delay timer)	.l							*********		
BT3	For Top Control Cabinet Gooling Fan (V1, V2)	15	(deg			Š.					
pace Heater			Dial:					(in the last			
R2	Heater for Top Control Cabinet	5	(deg	C)	4		ar ye dine	opia	e i specifici		15.
hermal Relay					-			Mark 1			
Q23	OP-101 (G.O. Pump)	1	25A			1					
Q24	OP-102 (G.O. Cooler)	I	2.0A								
Q20	OP-306 (Main Bearing L.O. Pump)		1.7A			9 1 - 3	41 . j				
Q15	C-301 (Main Bearing L.O. Cooler	1	3.8A								
Q16	OP-305 (Gear Box L.O Pump A)		7.2A							8 L.	1
Q17	OP-306 (Gear Box L.O Pump B)		7.2A								
Q21	C-302 (Gear Box L.O Cooler B)	1	4.0A								
Q27	C-305 (Transformer Cooler Fan)	1	1.4A					e a	for the first	and the	
Q25	C-401 (Converter Cooling Water Cooler Fan)		3.0A	SHIP N					********		
Q26	OP-401 (Converter Cooling Pump)		1.9A				(0),176,117,		**********		
F10A	M1 (No.1 YAW)	1	4.2A			ovana ir	maine			100000	
F11A	M2 (No.2 YAW)	1	4.2A		E000000					57 C 15 C 15 C	
F10B	M3 (No.3 YAW)	1	4.2A			in the same of		orani ing			
F11B	M4 (No.4 YAW)	1	4,2A		1		onnom.	aristman)	aromnor)	omorna	
Q10	YAW total		18A	MINIMUM.		onipito)		orani a a a a	overene)	, and an an	
Q12A	M5 (Generator Inner Cooling Fan A Lower)	†·····	3.0A	••••••					ammahaa	overeter)	
Q12B	M5 (Generator Inner Cooling Fan A Higher)		10.3A	ì			×		*********		
Q13A	M6 (Generator Inner Cooling Fan B Lower)	†	3.0A			on more	ratedition		*********	utana ta	
Q13B	M6 (Generator Inner Cooling Fan B Higher)	†	10.3A	············		entringe.	norionio	anninana Mariana	***********	mornio	
Q14A	M7 (Generator Outer Cooling Fan Lower)	†	2.3A			000000	(CONTRACT)	0.00000	Appropriate	wayow	
Q14B	M7 (Generator Outer Cooling Fan Higher)	·	7.0A						odenivo		
Q18	H-301/H-302 (Gearbox L.O. Heater)	1	6.0A			or the same	,,,,,,,,,,		Tarani Tara		
Q22	H-303 (Main bearing L.O. Heater)		1.6A	100 100 100 100			ninina.		aanuun	.,	
Q30A:	M-9 (NACELLE WINCH)	40,000	8.3A	varia arria		university	mana		monago	dama.	o control.
Q31:	M-11 (ROTOR TURNING MOTOR)	†*************************************	6.2A			en in in in in in in in in in in in in in	, indiana	107 A A A A A A A	vitativi vi	uvve vije	
ver Speed Detect		+	J.27			Din 9	Switch		5		_
voi opecu Detecti	ы	D1)2 T	D3	D4	D5	D6	D7	D8	D9	D10
U40(TOG1)	for LSS	0	7	1	1	1	0	1	0	0	0
U41(TOG2)	Over Speed Detector for HSS		;	···;	····	1	<u>o</u>	 	<u>ö</u>	+	t-ŏ-t
U42(TOG3)	Over Speed Detector	┼- Ÿ├-	;	····	1 1	7			7	1-0-	7

/h)	TOD		(configured	h.,	Inneteem)
w	IOF	FLV	COULTINGUEGO	υy	n kewani,

	Equipment Description						Se	tting				Sheet
CPU Card			Р	.F.R./C	OLD						net see tank	
-U10(BH2111)	CPU Card	Front panel	1	COL	D						100	2100
Communication			l t	ort1	\neg	port	2		port3		port4	7
			R	\$232		RS4	B5	F	R\$485		RS232	
1			R	S232		RS2	32	1	RS232	- 1	RS232	
-U11 (BH2504)	BH2504 - R\$232/R\$485	board		11 11 11 11 11 11 11 11		11 11 11 11 11 11 11 11		F	85485		RS485	2100
	BH2504 - HF/FD - [RS232]; don't care - [RS485]; HF:failsafe circuit ON - FD:failsafe circuit OFF	board		on't car HF DD	re)	HF HF III FD	-		HF HF FD		FD(don't care) HF FD	
Analog Card			AiO	Al1	Ai2	Al3	Al4	Al5	Al6	Al7	7	$\overline{}$
-U22	BH2353 8Analog Input	Front panel	V	٧	mΑ	mA	٧	mA	mA	m/	1	2124
-U23	BH2353 8Analog Input	Front panel	mA	mA	mΑ	mA	mA	mA	mΑ	m/	1 35 55	2125
Optic Star			Sw	itch S1		/off	S		1-2 or	n/off		/
-U51	AK9095 (Top/Hub/CCU)	board		0	ff				off		200	2101

MWT92/2.4 60Hz

Instrument Setting List

(3) TOP POWER CABINET (a) Cabinet Equipments

Equipment Description		Setting								Sheet			
Tr	nermostat			Dia	l:	-11-1			1000	ri dala	14 (4.2)	4	
i	BT4	For Top Power Cabinet Cooling Fan (V17)		15 (de	gC)			100	79.75				2003
ı	BT5	For Fan (V18, V19, V20, V21)		15 (de	gC)								2003
L	BT6	For Fan (V22, V23)		15 (de	gC)								2003
Sį	Space Heater		Dial:								Section 6		
ı	R1	Hater for Top Power Cabinet		5 (deg	(C)	E37000A	100000000000000000000000000000000000000	THE RESERVE	804G-848S-86TE				2005
ļ	R3	Hater for Top Power Cabinet		5 (deg	C)								2005
	R4	Hater for Top Power Cabinet		5 (deg	(C)								2005
Hy	/grostat			Dia	l:					10,740	er in de		
L	HT1	Relative Humidity		75 (9	6)				90.00	يالى: الله	4		2020
Tr	Thermal Relay						100		11.75		100		$\overline{}$
ı	Q7:	Transformer (T1/T2)		20/	1			40.00		in the last	14.3		2000
1	Q1A:	Grid Voltage (P)		0.14	A				40.00	F-1 4 7 8 7			2013
1	Q1B:	Grid Voltage (N)		0.14	A						-		2013
ı	Q3A :	Stator Voltage		0.14	A								2013
Ci	rcuit Breaker		L=	T1=	T2=	T4=	13=	S=	G=	N=			$\overline{}$
1	Q8	Circuit Breaker	0.91	6s	0.3s	1s	5.6	1	0.2	-			2000
ı	Q5	Circuit Breaker	0.68	3s	W.25"	-	1.5	T'''-	- T				2009
ı	Q2	Circuit Breaker	0.72	3s	v.£::	-	6.5	Ī'''-	-	50%			2000
L	Q9	Circuit Breaker	0.6	3s	0.25		5.5	[Off		1	2000

(4) Transformer CABINET

(a) Cabinet Equipments	
------------------------	--

Г		Equipment Description	Setting		Sheet
G	Fround Fault Relay		Carping (activity) or special	Contract Carlo Contract	
ı	GFR	GROUND FAULT RELAY	500mA/1sec		

EXHIBIT - N [FORM OF] CERTIFICATE OF FINAL COMPLETION

1.	Capitalized terms used herein have the meaning set forth in Appendix I (Definitions) and the Wind Turbine
	Generators Supply Agreement, dated as of, 2008 ("Supply Agreement"), by and between
	Babcock & Brown Infrastructure Group US LLC, as Owner ("Owner"), and Mitsubishi Power Systems
	Americas, Inc., as Seller (the "Seller").

- 2. Seller has delivered this certificate, completed except for signature of Owner, to Owner's duly authorized representative on the date first set forth above.
- 3. Seller certifies and represents, with respect to all [insert the total number of WTGs delivered by Seller to the Site] Wind Turbines, that the following statements are true as of the date set forth below;
 - (a) Substantial Completion has occurred;
 - (b) The Project Acceptance Test has been successfully completed in accordance with the Project Acceptance Test Procedures.
 - (c) Owner has received from Seller either (i) a final waiver, in the form specified in Exhibit- U-2 of the Supply Agreement, of all contractual liens and any mechanic's and materialmen's liens or other like liens available under Applicable Law that Seller or any of its subcontractors or vendors may have against Owner, the Project or the Site, or (ii) if Seller shall have used any subcontractors or vendors but is unable after diligent effort to obtain such final waivers, and such subcontractor or vendor shall not have asserted any such lien against the Owner, the Project or the Site, a certificate or undertaking letter (in form and otherwise subject to approval of the Financing Parties and guaranteed by MHI) to protect Owner, the Project and the Site from any and all claims that may made on account of such liens.
 - (d) All As-Built Drawings (if any) have been delivered to, and accepted by Owner;
 - (e) All of Seller's supplies, personnel, rubbish and waste have been removed from the Site;
 - (f) All Punch List items have been corrected or performed to Owner's reasonable satisfaction;
 - (g) Seller has issued and delivered to Owner for its countersignature this Final Completion Certificate in accordance with the provisions Section 9.4 (f) of the Supply Agreement.
- 4. Seller, and Owner hereby acknowledge and agree that all requirements as stipulated in Section 9.4(f) of Supply Agreement has been fulfilled and therefore Seller has achieved Final Completion.

[Remainder of Page Intentionally Blank]

Exhibit N - Final Completion Certificate Form

The persons signing below are authorized to sub-	nit this certificate to Owner for and on behalf of Seller.
Mitsubishi Power Systems Americas, Inc., as S	eller
Ву:	Date:
Name:	
Title:	
Acknowledged and agreed by the undersigned countersign this certificate for and on behalf of C Babcock & Brown Infrastructure Group US I	
Dabeock & Brown Infrastructure Group OS 1	inc., as Owner
Ву:	Date:
Name:	
Title:	

Exhibit N - Final Completion Certificate Form



Los Angeles Office ·100 Bayview Circle, Suite 4000 ·Newport Beach CA92660 ·Phone 949-856-8445 ·Fax 949-856-4481/4482

Exhibit-O Technical Advisor Fee Schedule

Rate Schedule (Standard Rate)

Site Manager Class: \$160.05/Hour

Mechanical Engineer: \$149.10/Hour

Electrical Engineer: \$149.10/Hour

Commissioning Engineer (Mechanical.): \$149.10/Hour

Commissioning Engineer (Electrical.): \$149.10/Hour

A. APPLICATIONS

1.	Travel Day	8 hours Standard Rate
2.	Weekdays up to 8 Hours/day between 7:00am & 6:00pm	Standard Rate
3.	Time in excess of 8 Hours/day (Service/Standby at weekdays)	1.5 Times Standard Rate
4.	Saturday Service	1.5 Times Standard Rate
5.	Service time of Sundays, Holiday or time in excess of 8 hrs/day at Saturday, & nocturnal time between 10:00pm &6:00a.m.	2.0 Times Standard Rate
6.	Standby Time from Monday to Friday except holidays.	Standard Rate

- Note 1: Tax: Any tax related to Technical Advisory Fee, Owner shall pay to Seller in the manner specified in Section 5.1.5 of the Supply Agreement
- Note 2: All subcontracted specialists will be billed to Owner at cost plus 15% administration.
- Note 3: Standby Time means any non-working hours from Monday to Friday except holidays in case working hours of a certain day does not reach eight (8) hours.

1/2

Confidential

B. EXPENSES

- Travel Expenses such as Airfare (Business class for International flights), Taxi, Rental car, etc. are invoiced at cost plus 10% handling fee.
- 2. Lodging is invoiced at cost plus 10% handling fee.
- 3. A per diem of \$70.00/day is charged to cover food and incidentals.
- 4. Telephone, telefax, and telex communications shall be invoiced at cost.
- Expenses (Passport, Visa, etc.) in connection with technical advisor's preparation for departure will be charged at cost plus 10% handling fee.

C. TERMS

1. Validity:

These rates are valid until the date of Substantial Completion of Project.

2. Payment:

100% cash payment within 30 days after presentation of Seller's invoice

3. Time Sheet:

The Seller's technical advisor will submit the time sheet weekly to Owner's representative at the Site who shall approve time sheets weekly. If Owner has any questions per time sheets, Owner shall assess and clarify with Seller's representative at the Site and determine the approved time sheet within a week.

If Owner fails to make the approved time sheet within a week, the Seller is entitled to claim the Technical Advisory Fee based on the time sheet which the Seller has submitted to Owner.

Exhibit P-1 - Form of Escrow Agreement

Execution Copy

WIND TURBINE ESCROW AGREEMENT

This WIND TURBINE ESCROW AGREEMENT ("Escrow Agreement") effective as of, 2008 (the "Effective Date"), by and among MITSUBISHI HEAVY INDUSTRIES, LTD., a Japan corporation ("Licensor"),, a limited liability company, (together with its successors, and permitted assigns and transferees, "Licensee"), and Bank of Commerce, a Wyoming banking corporation ("Escrow Agent") (Licensor, Licensee and Escrow Agent are herein referred to, collectively, as the "Parties").
RECITALS
A. Babcock & Brown Infrastructure Group US LLC, a Delaware limited liability company ("BBIG") has purchased wind turbine generators for the wind project located in County, (the "Project") pursuant to that certain Wind Turbine Generators Supply Agreement (the "Supply Agreement"), dated as of, 2008, by and between BBIG and Mitsubishi Power Systems Americas, Inc., a Delaware corporation ("MPS") and as assigned to Licensee as of, 2008, (the assigned wind turbine generators hereafter collectively referred to as the "Wind Turbines").
B. Licensor is the parent corporation of MPS, and the manufacturer of the Wind Turbines. Pursuant to the terms of the Supply Agreement, MPS is required to cause Licensor to enter into a mutually acceptable escrow agreement with Licensee.
C. BBIG (in its capacity as the "Owner") and MPS have entered into (i) that certain Warranty, Performance Test and Availability Guaranty Agreement, dated as of, 2008 (the "Warranty Agreement"), and (ii) that certain Wind Turbine Maintenance and Service Agreement, dated as of, 2008 (the "Service Agreement"). Each of the Warranty Agreement and the Service Agreement has been assigned to Licensee as of, 2008.
NOW, THEREFORE, in consideration of these premises and in consideration of the mutual covenants herein contained, and for such other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the Parties hereto, the Parties do

AGREEMENT

- 1. <u>Definitions and Interpretation</u>. All capitalized terms not otherwise defined herein shall have the respective meanings given to such terms in <u>Appendix I</u> Definitions, attached to the Supply Agreement, shall apply herein.
- 1.1 <u>Sections, Articles, Appendices and Exhibits</u>. References to Sections, Articles, Appendices and Exhibits are, unless otherwise indicated, made to Sections of, Articles of,

WIND TURBINE ESCROW AGREEMENT

hereby agree as follows:

Appendices to and Exhibits to this Escrow Agreement. The parties acknowledge that the Recitals, Appendices and Exhibits hereto form an integral part hereof.

- 1.2 Headings. The headings to Sections and Articles of this Escrow Agreement are for ease of reference only and do not form part of this Escrow Agreement and shall not in any way affect its construction or interpretation.
- 1.3 Gender. The masculine gender shall include the feminine and neuter and the singular number shall include the plural and vice versa, and references to persons shall include individuals, bodies corporate, unincorporated associations and partnerships.
- 1.4 Successors and Assigns. References to parties in this Escrow Agreement shall be deemed to include references to their successors and permitted assigns.
- 1.5 Miscellaneous. The words "herein," "hereof" and "hereunder" shall refer to this Escrow Agreement as a whole and not to any particular article, section or subsection of this Escrow Agreement. All accounting terms not specifically defined herein shall be construed in accordance with generally accepted accounting principles in the United States of America, consistently applied. References to this Escrow Agreement shall include a reference to all Exhibits hereto, as the same may be amended, modified, supplemented or replaced from time to time. References to any agreement, document or instrument shall mean a reference to such agreement, document or instrument as the same may be amended, modified, supplemented or replaced from time to time. The use of the word "including" in this Escrow Agreement to refer to specific examples shall be construed to mean "including, without limitation" or "including but not limited to" and shall not be construed to mean that the examples given are an exclusive list of the topics covered. The word "day" shall constitute a calendar day of twenty-four (24) hours measured from midnight to the next midnight.
- 2. Deposit of Plans and Licensee's Right to Inspect. Following the execution of this Escrow Agreement but prior to the Substantial Completion Date, Licensor shall deposit with Escrow Agent all plans and specifications for the Wind Turbines, including, but not limited to, the software, the software documents, electrical schematics, source codes and the information set forth in Exhibit A hereto, as will enable Licensee to repair, service, maintain or operate the Wind Turbines (the "Escrowed Items"). On and after the Substantial Completion Date, Licensor shall deposit such additional or supplemental materials with Escrow Agent as may be necessary accurately to reflect the design of the Wind Turbines as warranted under the Warranty Agreement, and the software, as the Wind Turbines, or the software, may be modified or adjusted after the Substantial Completion Date in accordance with the provisions of the Warranty Agreement. Escrow Agent is not required to take notice of the contents of the Escrowed Items, which Escrow Agent shall hold only for custodial purposes. Concurrent with the deposit of the Escrowed Items with the Escrowed Items so delivered.
- 3. <u>Confidentiality</u>. Licensee agrees to keep confidential any information or data contained within the Escrowed Items and shall use the Escrowed Items only for the purposes specified herein. Licensee shall not, directly or indirectly, publish or disclose any of the Escrowed Items, or the contents thereof, actually received by Licensee to any person and shall

take all reasonable actions and precautions to protect the confidentiality of the Escrowed Items; provided, however, that nothing herein shall be construed to prevent Licensee from disclosing any of the Escrowed Items, or any portion of the Escrowed Items (a) upon the order of any court or administrative agency or as otherwise required by law; (b) that is publicly available by reason of prior publication not attributable to any wrongful act or omission of Licensee or any of its respective officers, agents, representatives or employees; (c) that has been obtained from any person who was not similarly bound; (d) with the prior written consent of Licensor; (e) to Licensee's members, employees, agents, representatives, and contractors and any of the Licensee's successors and permitted assigns to the extent such disclosure is reasonably necessary or incident to Licensee's, its successors' or permitted assigns' ownership, construction, financing, operation, maintenance or servicing, repair, modification or retrofit of the Wind Turbines or the software; (f) to prospective purchasers of the Project, or (g) to any and all lenders providing senior or subordinated construction, interim or long-term debt financing or refinancing for the Wind Turbines or the Project, any member of Licensee providing leveraged leasefinancing, equity project financing or any refinancing for the Wind Turbines or the Project, and in each case any trustee or agent acting on their behalf, and any other persons expressing interest in providing debt financing or refinancing or other credit support to Licensee (each such lender or potential lender, a "Project Lender"); provided, however, that in each case under clauses (e), (f) and (g), Licensee shall be liable to Licensor for unauthorized disclosures by such persons in violation of this Agreement. If Licensee is ordered or required to disclose the Escrowed Items, or any portion of them, pursuant to clause (a) of the preceding sentence, Licensee shall promptly notify Licensor of such order or requirement and the terms thereof prior to such disclosure and shall cooperate with Licensor (the cost of which cooperation shall be borne by Licensor), to the maximum extent practicable and to the extent legally permissible, to minimize the disclosure of any portion of the Escrowed Items, including, without limitation, by not opposing Licensor's intervention in any actions regarding such disclosure so long as Licensor's intervention is being brought in good faith and does not constitute, in Licensee's reasonable opinion, an abuse of process, and using reasonable efforts (the cost of which shall be borne by Licensor) to seek from the ordering court protective orders limiting dissemination and use of the information and from the ordering administrative agency confidential treatment of such information. confidentiality obligations of Licensee hereunder shall remain in full force and effect for so long as the Escrowed Items are in the possession or custody of Licensee. It is agreed that in the event of any breach of this provision, the Licensor shall be entitled to an injunction or other equitable remedy in connection with any threatened or actual breach of this provision. The Parties acknowledge and agree that a breach of this provision would cause or result in irreparable harm to the Licensor for which an adequate remedy is not available at law.

- 4. <u>Request for Release</u>. Escrow Agent shall hold the Escrowed Items until such time as it receives written notice, pursuant to <u>Section 5</u> hereof, from Licensee (who shall send a copy to Licensor) stating that any one or more of the following has occurred:
- 4.1 the institution of bankruptcy or insolvency proceedings by or against Licensor or MPS, which proceedings have not been dismissed within ninety (90) days of filing; or
- 4.2 the inability or unwillingness of Licensor and MPS to supply Spare Parts for any WTG upon commercially reasonable terms and conditions.

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WIND TURBINE ESCROW AGREEMENT

- 5. Procedure for Release of Escrowed Items from Escrow and Grant of License.
- As soon as practicable, but in no event later than two (2) business days after (a) receipt by Escrow Agent of a written notice from Licensee that any of the events described in Sections 4.1, or 4.2 has occurred ("Licensee's Notice"), Escrow Agent shall provide Licensor with written notice ("Notice to Licensor") that Escrow Agent intends to release to Licensee the Escrowed Items then held by Escrow Agent within ten (10) business days of the date of Escrow Agent's Notice to Licensor (the "Release Date"). Such Notice to Licensor shall include a copy of Licensee's Notice and be transmitted by means authorized under Section 11 of this Escrow Agreement. With respect to any release requested in whole or in part due to an event described in Section 4.1, Escrow Agent shall release the Escrowed Items to Licensee on the Release Date. With respect to any release requested solely due to an event described in Sections 4.2, Licensor may, upon receipt of Escrow Agent's Notice to Licensor but prior to the Release Date, issue a certification in writing ("Licensor's Response") to Escrow Agent and Licensee that a reasonably acceptable alternative to releasing the Escrowed Items to Licensee then exists, which Licensor's Response shall describe such proposed alternative in detail. If, after receipt of Licensor's Response (with respect to an event described in Sections 4.2), Licensee certifies in writing to Escrow Agent, and Licensor that such alternative is unacceptable in Licensee's sole discretion (whether actually pursued by Licensee or not), Escrow Agent shall forthwith release the Escrowed Items then in its possession to Licensee five days following receipt of Licensee's Nothing contained herein shall be construed as prohibiting Licensee from petitioning a court of competent jurisdiction for immediate release of the Escrowed Items for extenuating circumstances.
- Licensor hereby grants to Licensee, effective upon the release of the Escrowed (b) Items by Escrow Agent pursuant hereto, a continuing, irrevocable, nonexclusive, fully-paid and royalty-free right and license for the useful life of the Wind Turbines (but not a right to sublicense except to any operator, manager or service provider hired or engaged by Licensee), to use, operate and otherwise work such Escrowed Items solely in connection with the operation and maintenance of the Wind Turbines for the Project and subject always to the obligations of confidentiality and restricted use hereunder. Licensor warrants, for a period of two (2) years following the termination of this Escrow Agreement, that the Escrowed Items, when provided to qualified personnel, are adequate to enable the manufacture of replacement parts for the entire WTG. In the event it is discovered that an Escrowed Item or Escrowed Items fail to conform to this warranty, the Licensee's exclusive remedy shall be for the Escrowed Item or Escrowed Items to be supplemented to enable the manufacture of the replacement part in question. LICENSOR MAKES NO OTHER WARRANTIES OR GUARANTEES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Licensor shall have no liability of any kind or nature arising out of, in connection with, or as a result of the use of the Escrowed Items whether or not such liability is claimed in contract, tort (including negligence and strict liability), warranty, or any other legal or equitable theory. The provisions of this Section 5(b) are not intended to affect the rights or remedies which Licensee may exercise in its capacity as Owner under the Service Agreement or the Warranty Agreement.
- 6. <u>Term and Termination</u>. This Escrow Agreement shall continue in effect for so long as Licensee continues to be the owner of or operate the Wind Turbines, unless terminated

earlier by (i) a complete release of the Escrowed Items to Licensee as provided in Section 5 of this Escrow Agreement, or (ii) Licensee's failure, after receipt of thirty (30) days' written notice from Escrow Agent to pay undisputed fees or costs of Escrow Agent which are then due and payable pursuant to Section 8. If this Escrow Agreement terminates by reason of cessation of payment by Licensee of the undisputed fees and costs required pursuant to Section 8 hereof, Escrow Agent shall forthwith return the software documents then held by it to Licensor. In the event the software documents are returned to the Licensor pursuant to the foregoing sentence, Licensor and Licensee agree to use good faith efforts to agree to alternative escrow arrangements substantially similar to those provided in this Escrow Agreement, provided that the reasonable costs incurred by Licensor with respect thereto shall be for the account of the Licensee (it being understood that invoices in connection therewith submitted by Licensor to Licensee prior to the fifteenth day of a month shall be paid by Licensee on or before the last business day of the month in which Licensor submitted its invoice, and that such invoices submitted by Licensor after the fifteenth day of the month shall be paid by no later than the last business day of the following month). It is agreed and understood that in the event of disagreement between the Parties hereto, Escrow Agent will, and does, reserve the right to hold the Escrowed Items in its possession, and all papers in connection with or concerning this Escrow Agreement, until mutual agreement has been reached between all of said Parties or until delivery is ordered by a court of competent jurisdiction. Escrow Agent is hereby authorized to comply with and obey any and all orders, judgments or decrees of any court of competent jurisdiction, and in case Escrow Agent so complies with any such order, judgment or decree, it shall not be liable to any other person, firm or corporation by reason of such compliance, notwithstanding any such order, judgment or decree be subsequently reversed, modified, annulled, set aside or vacated, or found to have been entered without jurisdiction.

- 7. <u>Indemnity</u>. Licensee and Licensor agree to indemnify, defend and hold harmless Escrow Agent from and against any loss or liability, including but not limited to reasonable attorneys' fees and other costs, on account of any claims against Escrow Agent arising out of its responsibilities under this Escrow Agreement, except to the extent that such claim arises from Escrow Agent's gross negligence, willful misconduct or willful breach of its obligations hereunder. Escrow Agent shall not be liable for any act it may do or omit to do hereunder as Escrow Agent while acting in good faith and in exercise of its own best judgment, and any act done or omitted by it pursuant to the advice of its own attorney shall be conclusive evidence of such good faith. Escrow Agent may rely upon any paper, document or other writing believed by it to be authentic in taking any action hereunder.
- 8. Compensation. As consideration for the undertakings herein, Licensee shall pay to Escrow Agent, within fifteen (15) business days following the initial deposit of Escrowed Items, and on each anniversary of such initial deposit, an annual fee in the amount of Three Hundred Fifty and 00/100 Dollars (\$350.00) together with all reasonable out-of-pocket costs (not to exceed, in any year, Five Hundred and 00/100 Dollars (\$500.00)) incurred by Escrow Agent to maintain the escrow established hereunder, including, but not limited to, the costs of the rental of an appropriate safe deposit box(es) for storage of the Documents (the "Annual Fee"). In addition to the Annual Fee described herein, a one-time charge of Two Hundred and 00/100 Dollars (\$200.00) will be due and payable by Licensee to Escrow Agent within fifteen (15) business days of the Effective Date. Escrow Agent agrees to provide Licensee with such invoices and

supporting documentation as Licensee may reasonably request in connection with Escrow Agent's out-of-pocket costs described above.

- 9. <u>Assignment</u>. This Escrow Agreement shall be binding upon and inure to the benefit of the successors and permitted assigns of the Parties hereto. Except as set forth below, this Escrow Agreement may only be assigned in connection with an assignment of the Service Agreement, Warranty Agreement or Supply Agreement. Escrow Agent's assignment or transfer of its right, and interests under this Agreement is governed strictly by <u>Section 10</u>. Each of Licensor and Escrow Agent further hereby consents to the assignment by Licensee of all of Licensee's rights, title and interest in and under this Escrow Agreement and the Escrowed Items to be delivered hereunder in connection with any financing involving the Wind Turbines, to any Project Lender, and each of Licensor and Escrow Agent agrees to execute and deliver, upon request of Licensee, one or more consents to collateral assignment in a form reasonably acceptable to the Licensor and Escrow Agent.
- 10. Resignation and Termination of Escrow Agent. Escrow Agent may resign, subject to the following subclause (b), thirty (30) days after it has given written notice thereof to each of the other Parties hereto. In addition, Escrow Agent may be removed and replaced on a date designated in a written instrument signed by Licensor and Licensee and delivered to Escrow Agent. The termination or resignation of Escrow Agent shall take effect on the earlier of (a) the appointment of a successor escrow agent by Licensor and Licensee or (b) in the event that thirty (30) days has passed since Escrow Agent's notice of resignation and a successor escrow agent has not been appointed pursuant to clause (a) above, issuance of written notice by Escrow Agent that it has appointed a successor escrow agent that will serve pursuant to the terms of this Escrow Agreement.
- 11. Notices. Any notice required or authorized to be given hereunder or any other communications between the Parties provided for under the terms of this Escrow Agreement shall be in writing (unless otherwise provided) and shall be served personally or by reputable express courier service or by facsimile transmission addressed to the relevant Party at the address stated below or at any other address notified by that Party to the other as its address for service. Any notice so given personally shall be deemed to have been served on delivery, any notice so given by express courier service shall be deemed to have been served two (2) business days after the same shall have been delivered to the relevant courier, and any notice so given by facsimile transmission shall be deemed to have been served on dispatch. As proof of such service it shall be sufficient to produce a receipt showing personal service, the receipt of a reputable courier company showing the correct address of the addressee or an activity report of the sender's facsimile machine showing the correct facsimile number of the Party on whom notice is served, the correct number of pages transmitted and the date of dispatch.

SUBJECT TO PROTECTIVE ORDER: CIV. ACT. NO. 3:10-CV-276-F